THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT
June 18, 1990 · Vol. XXIV · No. 25 · 142 Pages · $2/Copy · $48/Year

COMPUTERWORLD

INSIDE

In Depth — How credible are you? Learn to boost your image. Page 99.

Product Spotlight — It'll take more than speed to get the I486 on corporate desktops. Page 81.

You want Unix? Lotus moves to fill packaged application needs with 1-2-3 for several Unix PC brands. Page 7.

Uncle Sam's bookkeeping bashed: Auditors say Treasury Department systems have not been able to verify multibillion-dollar accounts. Page 132.

The first full set of OSI network management protocols was released by a vendor group last week. Page 8.

Will Cray Research build or buy the new architecture that company officials concede is needed by the end of the decade? Page 25.

Tally ho: Can a $7.50-per-unit software package be cause for success? Tally Systems Corp. sees quick growth with PC inventory management software. Page 101.

Covia chief flies off to CIO seat at Northwest Airlines. Page 6.

Compaq to use speedier 386SX in addition to SLT laptop line. Page 8.

NEWSPAPER

Olsen upbeat, but profits sag

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. President Kenneth H. Olsen last week sketched a future bright with technology advances for DEC users, but he dulled the hopes of the investment community by confirming that the VAX 9000 mainframe will not ship in volume until later this summer.

In an interview with *Computerworld*, Olsen said reduced instruction set computing technology — now being built into some features of the VAX 9000 — will expand throughout future VAX computer lines.

He also said Ultrix, DEC's version of AT&T's Unix System V operating system, will eventually blend with the Open Software Foundation's Unix version, which is slated to be introduced this fall.

Martha Everson
DEC President Olsen *high on technology, low on Wall Street*

Analysts said DEC's internal development of the so-called E VAX — a RISC-based machine that will run the proprietary VMS operating system — is expected to produce the new breed of VAX systems by the middle of this decade.

When the VAX 6000 Model 500, a new top-end model for the powerful midrange line, makes its debut in late summer or early fall, it is also expected to contain RISC elements meant to boost its processing speed.

However, Olsen had little welcome news for stock watchers, who were hoping that the VAX 9000 would give DEC a much-needed earnings boost this quarter. "We never promised real deliveries until next quarter," he said. "On the inside, we hoped we would get out more, but we never counted on that."

Adding another damper to financial expectations last week was James Osterhoff, DEC's vice-president of finance. He told a group of investment professionals in New York that a

Continued on page 133

D&B Software ready to face skeptical M&D user crowd

BY MAURA J. HARRINGTON
CW STAFF

On the eve of their annual user group conference, many McCormack & Dodge customers are voicing concerns about the future of the M&D product line and the level of support they will receive from Dun & Bradstreet Software now that former Management Science America, Inc. Chairman John Imlay has taken charge.

D&B Software will attempt to allay those fears at this week's conference in San Francisco by introducing an on-line bulletin board service as well as additional support services for M&D customers, the company said.

"We have made all of the organizational changes and personnel changes," said Jim Henderson, executive vice-president at D&B Software, at a recent industry conference. "Also, we have been very careful to try and shield [the effects of] this merger from our customers, so I sincerely hope you haven't seen any impact on your company because of the merger."

Customers of the former M&D unit are taking a "show-me" stance, however. "That all sounds like a bunch of motherhood and apple pie to me," said Roger Hesslau, applications systems manager at Walgreen Co., based in Deerfield, Ill.

Hesslau said he was concerned that D&B Software was

Continued on page 4

Don't yank those wires out just yet

BY JOANIE M. WEXLER
CW STAFF

Companies ogling the high-speed capability of fiber-optic cable may soon be able to use their existing copper wiring to get those speeds at lower prices.

Synoptics Communications, Inc. and Chipcom Corp. said in separate announcements last week that they have developed technologies for running 100M bit/sec. data traffic over twisted-pair wiring as a lower cost alternative to the fiber medium specified in the standard for Fiber Distributed Data Interface local-area networks.

Both said they intend to present their competing technologies at this week's American National Standards Institute FDDI committee meeting with the goal of creating a standard for running the high data rates over twisted-pair and accelerating FDDI to the desktop.

While the two announcements "push the edge of technology and offer users interesting

Continued on page 6

REBEL WITH A CAUSE

Next finds revolution a Long March

BY AMIEL KORNEL
and JAMES DALY
CW STAFF

Maybe it's the visionary thing. Or maybe it's just more California hype. But every time Steve Jobs develops a new computer, he and his backers predict that it's going to rock the world.

While Jobs' first brainchild, Apple Computer, Inc., did indeed launch a new era in computing, skeptics are wondering whether the same magic has rubbed off on his newest venture.

Jobs unveiled the sleek black Next, Inc. computer in October 1988, saying it boasted enough technological innovations to fundamentally change the face of corporate computing.

Reviewers raved. "When Steve came out with it in '88, I saw something I hadn't seen done before on Unix," said James Bruce, vice-provost for information systems at MIT and a member of Next's Educational Advisory Board. "It was revolutionary."

As time passes, however, the Next workstation has come to seem less radical. In the fast-changing world of high-tech, Jobs may have lost his edge.

Continued on page 130

Robert Holmgren
The man and his machine: *Steve Jobs and the Next system*

IN THIS ISSUE

NEWS

4 Surveyed Americans show concern that the Information Age will bring skeletons rattling out of the closet.

6 Barry Kotar books a first-class ticket into Northwest's CIO seat.

7 Lotus spreads two pairs of 1-2-3 versions for Unix on the table.

8 A study of 31 U.S. firms shows a trio of IS jobs taking a big hike in pay.

10 NSFnet hits the links at high speed.

12 Racal-Interlan burns its bridges, closing the door on LAN Manager/Netware connecting products.

14 Candle Corp. looks for 1,000 points of light in the VTAM market.

130 Black box blues: The radical Next computer is no easy sell.

131 Is Nextstep a giant step for Steve Jobs' newest venture?

132 Unisys gains a common user interface to CTOS.

133 Ingres egress: DEC declines a minority position in the relational database company.

Quotable

"Everyone agrees that if it had been able to come out a year earlier, it would have seemed more spectacular."

RICHARD CYERT
CARNEGIE MELLON
UNIVERSITY

On the Next machine. See story page 1.

SYSTEMS & SOFTWARE

25 Cray Research has parallel processing solidly entrenched in its vision of the future, but whose?

PCs & WORKSTATIONS

41 Is the PC industry hiding an empty future behind all the announcement glitz?

45 Veteran's Affairs Medical Center brings its data interpretation methods into the Information Age.

NETWORKING

59 Legato's Networker clears the path to finding lost network files.

MANAGER'S JOURNAL

71 These days, IS finds a place in the Sun R&M Co. through decentralization.

COMPUTER INDUSTRY

101 Tally ho! Tally Systems leads the pack in the hunt for a PC inventory management tool.

PRODUCT SPOTLIGHT

81 While some break speed records on 486-based PCs, others wait for an appropriate operating system to appear.

IN DEPTH

99 Credibility can make or break an IS career. By William Harris and Susan Behnke.

DEPARTMENTS

6, 132 News Shorts
18 Advanced Technology
22 Editorial
76 Calendar
72 Book Review
111 Computer Careers
122 Marketplace
127 Training
129 Stocks
134 Trends

Your spouse thinks it's all fun and games, but business travel is what business people most love to hate. A sampler of "hates" from a recent survey of 650 frequent-flyer members of the American Productivity & Quality Center includes these quips: "Flights canceled for unbelievable reasons, like not enough sleep for crew, no pilot, other apparent lies." "Ants in my bed. No apologies from hotel. Sent a guy who looked like he was out of a horror movie to move me late at night." "Plane had a power failure that lasted several seconds. Screaming, yelling, food all over. Told us it was wind shear. Bull. It was a flameout, pure and simple."

'No thanks, I'll walk,' say many potential buyers of the 486-based PC. Page 81.

Alan Levenson

Security Pacific Bank's Richard Harmel turned to a relational database and windowed workstations in cleaning up a systems mishmash. Page 29.

EXECUTIVE BRIEFING

■ **The annual McCormack & Dodge users group conference** opens today in San Francisco amid widespread skepticism about product support under the MSA-dominated management of D&B Software. D&B Software will try to allay those fears by announcing 24-hour hot-line support and an on-line bulletin board help desk. **Page 1.**

■ **Movement in the IS executive ranks continues** as Barry Kotar, president of United Airlines' computerized reservation system subsidiary Covia, hopped on board with competitor Northwest Airlines. Kotar fills the spot left vacant when William Sitter became Allstate's CIO last year. Separately, former Chrysler MIS Director G. Nichols Simonds became the new IS chief at Honeywell, and Dale Riordan was named to the top IS post at Fannie Mae. **Stories, pages 6, 132.**

■ **IS executive pay is 9.4% higher than last year,** according to a survey of 31 large corporations. However, top positions in systems planning, disaster recovery and database administration zoomed 25% or more. **Page 8.**

■ **A Harris poll** found that 79% of Americans are concerned about threats to their privacy in the computer age. A shocking 45% agreed with the statement that "technology has almost gotten out of control." **Page 4.**

■ **DEC customers will see a wide range** of technology advances in the next few years, DEC President Ken Olsen said in a *Computerworld* interview. RISC architecture will become more prevalent throughout the VAX product line, and Ultrix will eventually blend with the Open Software Foundation's Unix version. However, the VAX 9000 will not ship in volume until late this summer, dimming Wall Street's hopes of a DEC financial rebound. **Page 1.**

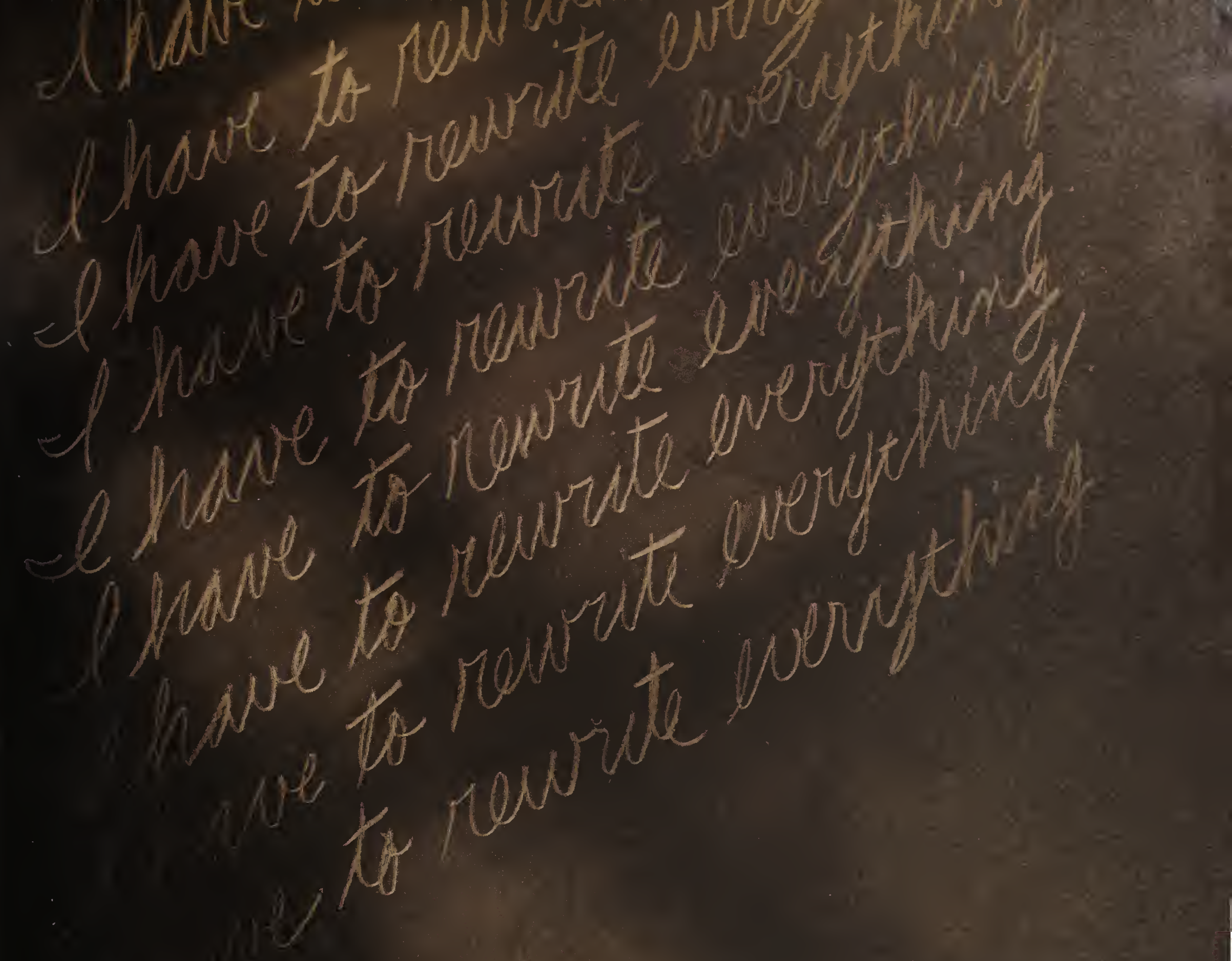
■ **Oil giant Sun R&M Co. decentralized its IS department** last year with the intention of getting systems decisions closer to the business units. However, the move has reaped the added benefit of promoting IS managers to "first-class citizens" who participate in business unit budget and personnel decisions. **Page 71.**

■ **A comprehensive study** of the true costs and benefits of electronic data interchange has been been launched by an auto industry IS group and Carnegie Mellon. Researchers will study the use of EDI at Chrysler, LTV, Texas Instruments and Southwestern Bell. **Page 6.**

■ **The Next machine has not set the world on fire,** despite the hype and hope of Next founder Steve Jobs. Next's lackluster sales prove once again that whiz-bang, ahead-of-its-time technology can be a tough sell in the marketplace. **Stories, pages 1, 130 and 131.**

■ **Equipment arbitrage is legal,** and a manager at John Hancock's IS group says it offers a leading-edge technological strategy without financial bleeding. It means buying products at deep discounts any way possible and selling them into the used-equipment market just before prices soften. **Page 122.**

■ **On-site this week:** Security Pacific's global trading centers on four continents rely on the client/server model, with DEC's RDB relational database as the anchor. **Page 29.** Managing 500 local-area networks across the country isn't easy. Martin Marietta employs fast-packet multiplexer technology to do the job while cutting down on T1 lines. **Page 59.** Veteran's Affairs Medical Center in Palo Alto, Calif., has brought in workstations from Silicon Valley neighbor Sun Microsystems to track and interpret patients' diagnostic data. **Page 45.** The vacations that dreams are made of will depend on IBM Systems Network Architecture peer-to-peer connections at Miami's Cruiseship Information Systems, an electronic cruise booking service. **Page 60.**


I have to rewrite everything
I have to rewrite everything
I have to rewrite everything
I have to rewrite everything
I have to rewrite everything
I have to rewrite everything
I have to rewrite everything
I have to rewrite everything
I have to rewrite everything

You Shouldn't Be Punished For Moving Up To A Relational Database.

You should be rewarded.

With CA-DATACOM/DB® or CA-IDMS/DB® you can now have relational technology while protecting your current application investments.

CA90s

CA's Computing Architecture For The 90s protects and enhances the value of every CA software solution.

Only CA transparency software offers you, the VSAM, DL-I, TOTAL or IMS user, the unique opportunity to run all your current applications in a relational environment without any rewriting.

Ultimately this saves you millions of dollars because existing applications that took hundreds, perhaps thousands of man hours to create are ready to use as is. The moment you switch over to high-performance CA-DATACOM/DB or CA-IDMS/DB you can unify all your data and applications into a single relational environment. With no expensive conversions. No relinking. And no recoding.

What's more, CA relational database technology will protect your future investments with SQL support, compatibility and portability across multiple platforms.

Call Dana Williams at **1-800-645-3003** and find out how thousands of our clients moved up to a relational technology easily and economically. We promise it will be a rewarding, experience.

COMPUTER ASSOCIATES
Software superior by design.

[illegible]
VSAM, DL/I and IMS are products of the IBM Corporation.

© 1990 Computer Associates International, Inc., 711 Stewart Avenue, Garden City, NY 11530-4787.

Consumers fear threat to privacy

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Because of a gut-level distrust of government, business and "uncontrolled technology," nearly four out of five U.S. consumers (79%) are concerned about threats to their privacy in the computer age, according to a Louis Harris and Associates, Inc. opinion poll released last week.

Humphrey Taylor, president of the New York-based polling firm, said the national survey of 2,254 consumers "sends a strong warning signal" to companies that have databases of consumer information. Businesses that fail to respond to consumer concerns about privacy may wind up facing strict government regulation, he said.

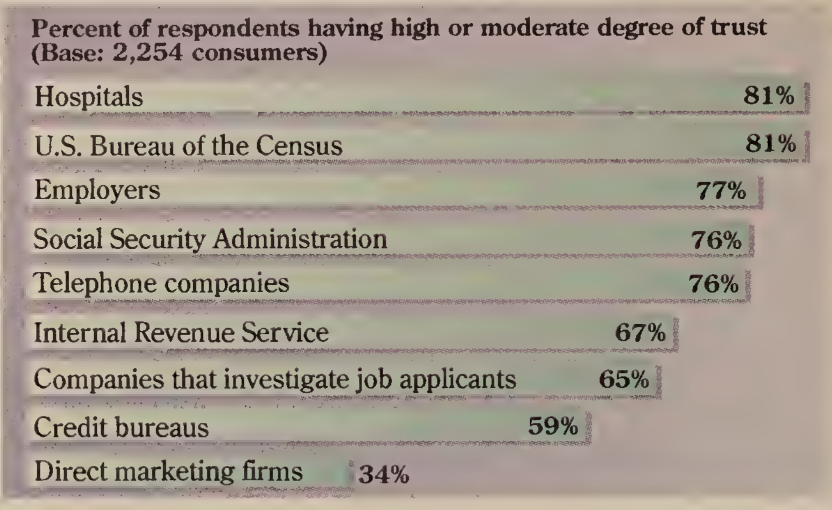
Alan F. Westin, a Columbia University professor and academic adviser for the poll, attributed the results to the public's general distrust of large institutions and technology. The poll found that 45% of Americans agreed with the statement that "technology has almost gotten out of control."

The survey comes at a time when many consumer advocates are upset about the trend toward "database marketing," in which direct-marketing firms compile lifestyle databases and credit profiles for highly targeted marketing campaigns [CW, May 14].

The poll found high levels of trust that hospitals, government agencies and employers will handle personal data in a responsible manner, but consumers put direct-marketing and credit-reporting firms at the bottom of the list (see chart).

Who can be trusted with private data?

Direct marketing and credit-reporting firms rank lower than the IRS when it comes to trusting them with personal information



Source: Louis Harris and Associates, Inc. CW Chart: Doreen Dahle

Seven out of 10 U.S. consumers (71%) feel they have lost all control over how personal information about them is circulated and used by business, while 79% believe privacy ranks with "life, liberty and the pursuit of happiness" as a fundamental right, the survey found.

The poll results may provide a boost for several legislative proposals — such as a bill creating a federal privacy oversight board and another one regulating Caller ID services — now getting attention in Congress, according to Marc Rotenberg, spokesman for Computer Professionals for Social Responsibility.

Westin said the most progressive firms have adopted a code of "fair information practices" and formed consumer advisory boards to help management respond to privacy concerns. "The winners in industry will be those that listen and respond," said Bonnie Guiton, consumer adviser to President Bush.

Despite the strong concern about privacy, Westin said, U.S. consumers are also pragmatic. He said they are willing to divulge personal information if they believe it will be handled fairly and they will get some "bargain" in return.

The poll found that 78% of the consumers admitted they would be upset if they could not obtain credit based upon their record of paying bills — an opportunity made possible by credit databases. "Consumers want it all. They want privacy, and they want the consumer society," Westin said.

The poll was commissioned by Atlanta-based Equifax, Inc., a provider of consumer financial data and a major player in the credit bureau industry. Taylor praised Equifax for its "gutsy decisions" to sponsor a poll likely to produce adverse publicity and to give Harris full control over the poll's content.

C. B. "Jack" Rogers Jr., president and chief executive officer of Equifax, explained that the company wants to take the "high road" on the privacy issue and is planning to capitalize on it this fall by introducing an unspecified service "designed to give consumers a more active role in direct marketing."

D&B

FROM PAGE 1

heavily MSA-dominated and that M&D support could fall by the wayside because the company has limited resources.

Other M&D customers said that they have already begun to notice a decline in the quality of support during recent months.

"You get the feeling that the company is thinking of their bottom line first, with plans of filling in the gaps later," said Patricia David, an M&D user at Merrill Lynch & Co. in New York. "The quality of support just isn't there right now."

"If [D&B Software] does not increase their customer support and service enough to accommodate the combined customer base, then the merger will be a failure in my eyes," said Michael Coxhead, assistant vice-president of MIS at Chicago-based JMB Properties and national co-chairman for M&D's Tools user group.

However, according to Julie Donahue, vice-president of worldwide product support, customers will be more than satisfied with D&B Software's plans to beef up product support.

Donahue said that users are in for a big surprise when the company unveils its support strategy at this week's meeting.

Insight, the bulletin board Help system that will be on display at the conference, is due to be available within 30 days, Donahue said.

"The most significant announcement we will be making is that we will be offering our customers a new service that will give them 24-hour support for production-down situations," Donahue said, explaining that a 24-hour hot line will be set up with consultants on call for emergency situations.

While D&B Software plans to focus immediately on users' concerns with support, the company will not be releasing information about future product line directions until late August or September, Imlay said in a recent phone interview.

"As far as what will happen with the product lines, I don't think we know yet. I don't think [D&B Software] knows yet. I think we'll just have to wait and see at this point," said Bonita Paynter, an M&D user and director of financial systems at Kraft, Inc. in Glenview, Ill.

As for the company's stability throughout the merger, Imlay said, sales are up by 25% this quarter, based on combined sales for the same quarter last year.

Bill McNee, an analyst at Gartner Group, Inc.'s Software Management Strategies service, said sales were up because of customers who had a "wait and see" attitude and have come off the fence this quarter to fulfill their back product demands.

However, he added that sales will probably stagnate after this quarter for a while until the company's next-generation product line comes out.

Indignity rankles

D&B Software has said that organizational changes are behind the newly merged firm, but bitterness lives on in the M&D employees who lost their jobs.

Although the D&B Software severance program, called the Merger Action Plan, was officially completed on May 31, many former M&D employees are still upset about the severance process.

"They could have done this with much more dignity. Instead, they came into a department, called a meeting on a Thursday morning, and those who made it through the day would know they had their job for one more week," a former M&D employee said.

Another employee, who still works at the firm, said the Natick, Mass., office was virtually unaware that there were layoffs at Management Science America in Atlanta — the firm M&D merged with — until someone called a Natick employee after being laid off. "It would have helped if we had known what was going on, rather than being treated like numbers," the employee said.

Severance packages were given to approximately 325 people worldwide, reducing the work force by about 10%, according to Ken Millen, director of human resources at D&B Software. "About 100 people were severed in Atlanta and 125 in Natick, as well as another 100 people worldwide," he said. The severance program cost D&B Software about $10 million, Millen said.

"I think, in most cases, there are people in the company that are bitter, but when I look at what we've done in our area, inside and outside of our industry, I think we've done a good job," Millen said.

COMPUTERWORLD

Editor in Chief
Bill Laberis

Executive Editor
Paul Gillin

News Editor
Peter Bartolik

Assistant News Editor
James Connolly

Senior Editors
Clinton Wilder, Management
Elisabeth Horwitt, Networking
Patricia Keefe, PCs & Workstations
Michael Alexander, Advanced Technology
Rosemary Hamilton, Systems & Software
Nell Margolis, Industry

Senior Writers
Alan J. Ryan
Maryfran Johnson
Joanie M. Wexler

Staff Writers
Richard Pastore
Sally Cusack
Maura J. Harrington

New Products Writer
Gary Byrne

Features Editors
Glenn Rifkin
Joanne Kelleher

Senior Editors
Michael L. Sullivan-Trainor
Amiel Kornel
Joseph Maglitta,
In Depth/Integration Strategies
Mary Grover, Product Spotlight

Managing Editor, Special Projects
Lory Zottola

Senior Writer
David A. Ludlum

Associate Editor
Laura O'Connell

Researchers
Jodie Naze
Kim Nash

Interns
Kelly E. Dwyer
Derek Slater

Chief Copy Editor
Donald St. John

Assistant Chief Copy Editor
Joyce Chutchian

Features Copy Editors
Cathleen A. Duffy
Carol Hildebrand

Copy Editors
Catherine Gagnon
Christopher Lindquist
Kimberlee A. Smith
Toby Dorsey

Design Director
Nancy Kowal

Graphics Designer
Tom Monahan

Graphics Specialist
Paul Mock

Design Assistant
Marie J. Haines

Graphics Researcher
Kevin Burden

Assistant to the Editor in Chief
Linda Gorgone

Editorial Assistants
Lorraine Witzell
Tammy Gryniewicz
Stefanie McCann

Rights and Permissions Manager
Sharon Bryant

Back Issues
Margaret McIndoe

News Bureaus
Washington, D.C.
Mitch Betts, National Correspondent
202/347-6718
Gary H. Anthes, Correspondent
202/347-0134

West Coast
415/347-0555
Jean Bozman, Senior West Coast Editor
J.A. Savage, Senior Correspondent
Charles von Simson, Senior Correspondent
James Daly, Senior Correspondent
Jim Nash, Correspondent
Chris Flanagan, Editorial Assistant

Midwest
708/827-4433
Ellis Booker, Correspondent
Michael Fitzgerald, Correspondent

IDG News Service
Penny Winn, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
508/879-0700

Fax: 508/875-8931

MCI Mail: COMPUTERWORLD

Subscriptions: 800/669-1002

New Twist On An Old Problem

Oracle's protocol-transparent network products unify incompatible networks.

If you like industry standards you'll love networking. Because there are so many network standards: Ethernet, Token Ring, Named Pipes, DECnet, LU6.2, FDDI, TCP/IP, SPX/IPX, X.25, SNA, etc.

Oracle's software lets you integrate all the networks you have today and adopt new technologies as they emerge.

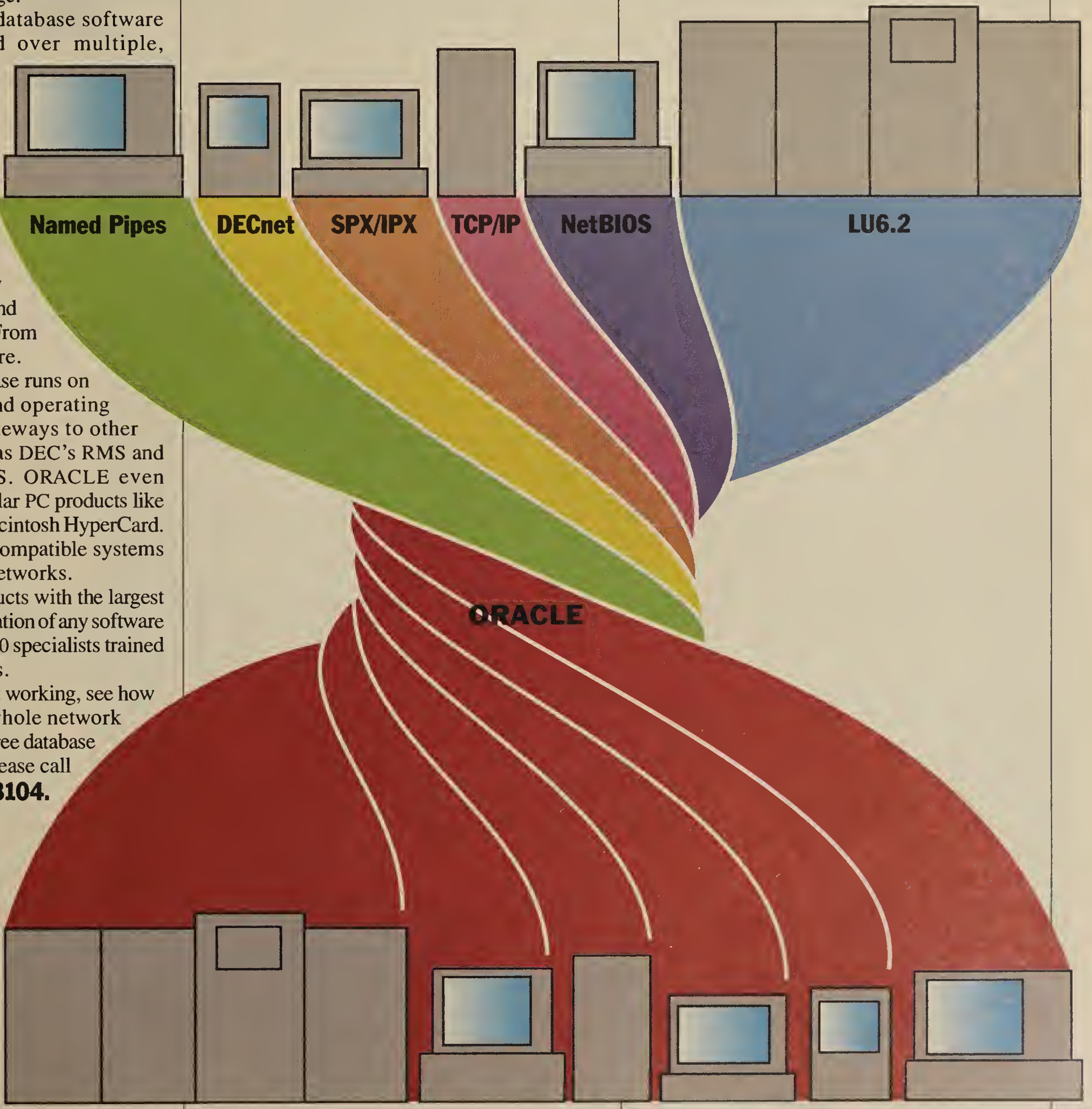
Oracle's network and database software makes data distributed over multiple, incompatible networks and computers appear as if it were a single database on a single computer. So users can get the information they need without having to know where it comes from.

This is because ORACLE works with virtually every network protocol, media and network operating system. From LU6.2 to DECnet to NetWare.

And the ORACLE database runs on every major computer and operating system. It also offers gateways to other major data sources such as DEC's RMS and IBM's DB2 and SQL/DS. ORACLE even supports access from popular PC products like Lotus 1-2-3, dBASE, and Macintosh HyperCard. So companies can turn incompatible systems into a unified network of networks.

Oracle backs all its products with the largest service and support organization of any software company, including over 200 specialists trained to handle networking issues.

If your networking is not working, see how one twist can turn your whole network around. To sign up for our free database conference in your area, please call **1-800-633-1071 ext. 8104.**



ORACLE®

Compatibility • Portability • Connectability

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

NEWS SHORTS

Administration: Audit credit records

In response to consumer complaints about inaccuracies in credit bureau databases, Bonnie Guiton, consumer adviser to President Bush, last week suggested the government audit a sampling of credit files for accuracy and publish the results annually. She told Congress that this approach — similar to the federal report card on airlines' on-time arrivals — would be an incentive for credit bureaus to improve their records for accuracy.

……

Fannie Mae names IS chief

The Federal National Mortgage Association last week named Dale P. Riordan as executive vice-president for operations and systems, with a mandate to fully integrate Fannie Mae's "business side with the company's information technology capacities." Riordan was previously head of marketing and has rotated through several other senior positions at the mortgage investment firm. He succeeds Samuel A. Alward, who will become technical adviser to the company president. The company said it converted records for six million loans from manual to computer systems under Alward's leadership.

……

Reach way out and touch someone

In an unprecedented acquisition, two regional Bell holding companies pooled their cash last week to purchase a foreign telephone company. Ameritech and Bell Atlantic Corp., along with two New Zealand investors, said they would purchase the state-owned Telecom Corp. in New Zealand for approximately $2.4 billion. At the conclusion of the deal, Ameritech and Bell Atlantic will hold 24.95% of the New Zealand telephone company, which has 3.3 million subscribers.

……

E-mail directory debuts

3Com Corp. last week announced 3+Open Directory, which it claimed is the first multivendor global naming directory for LAN Manager systems. Based on the still-incomplete CCITT X.500 electronic mail directory standard, the directory is said to provide users with a single repository for network names and addresses and to synchronize directory updates across the network. 3Com also announced 3+Open Menus, which will allow users to access applications or information across networks not only from 3Com but also from Novell, Inc. and Banyan Systems, Inc. Both products are scheduled for delivery in the fall.

……

Sun signs up Mentor

A week after electronic design automation firm Mentor Graphics Corp. renewed its contract with Hewlett-Packard Co. for reselling its Apollo Division workstations, the firm inked a similar agreement with Sun Microsystems, Inc. Mentor's software, which had been installed only on the Apollo platform since 1981, will be on Sun-based products by the end of the year.

……

Stratus backs OSF standard

Stratus Computer, Inc. last week announced that it will support the Open Software Foundation's Distributed Computing Environment (DCE) software on both the proprietary VOS and FTX, Stratus' version of AT&T Unix System V. DCE is a proposed industry standard software technology for distributed applications shared by multiple vendors' networked computers. It is endorsed by IBM, Digital Equipment Corp., HP, Microsoft Corp. and other prominent vendors.

……

IBM strikes Kodak deal

IBM tapped into the publishing world last week through a joint venture with Eastman Kodak Co., owner of the Atex Publishing Systems unit. The two companies said that they plan to mount a standards-based publishing systems architecture to be used by magazines and newspapers throughout the world. IBM denied reports that it was taking an equity stake in Atex.

More news shorts on page 132

Northwest lands Covia CEO

BY ELLIS BOOKER
CW STAFF

MINNEAPOLIS — Barry A. Kotar booked himself a one-way flight here last week, leaving his post as president and chief executive officer at Covia Corp. to join Northwest Airlines as its executive vice-president and chief information officer.

Kotar's arrival at Northwest completes the loop-de-loop that started last year at Northwest — the nation's fourth largest carrier — when then-top information systems executive William H. Sitter left the firm to join Allstate Insurance Co. as CIO and senior vice-president of information technology [CW, Oct. 2].

"Barry is the premier automation expert in the airline industry, and he is an important part of the executive team we have assembled over the last several months," said Northwest Chairman Al Checchi in a prepared statement.

Kotar will oversee Northwest's entire computer and communications operation, including its executive information service, telecommunications and systems development for computer applications in all of the airline's departments and divisions.

Kotar lands *at Northwest as V.P. and CIO*

Kotar came to Rosemont, Ill.-based Covia in 1987 from United Airlines, which spun off its Apollo computerized reservation system operation as Covia in 1987.

Today, Covia is jointly owned by United and a group of domestic and foreign airlines.

During his 20-year tenure at United, Kotar held several management titles, including senior vice-president of MIS, vice-president of Apollo service and vice-president of customer services.

In another recent IS change at Northwest, Douglas J. Schwinn, senior director of information systems development, left the company late last month to join Hayward, Calif.-based department store chain Mervyn's as its director of systems and programming.

Covia Vice-President of Business Development Paul Blackney had been named acting president and CEO, according to a Covia spokesman.

Wires

FROM PAGE 1

choices," users expressed some concern about error rates and distance limitations between nodes — particularly using unshielded wiring, said Alice J. Bradie, a principal at Hambrecht & Quist, Inc. in New York.

"I see where this would be beneficial, but I seriously question the quality of the [unshielded twisted-pair] wires in older buildings for running 100M bit/sec.," said Bill Riess, a senior engineer at Commonwealth Edison in Chicago.

Dave Fowler, vice-president of marketing at Chipcom, acknowledged that there is "no guarantee that all existing wire will run at 100M bit/sec.," but noted that users with data-grade wiring installed within the last four to five years would be prime candidates for the technology.

The vendors said that the full benefits of FDDI could be realized using the alternative medium, but the proposed technologies accommodate nodes attached to just one of the dual counter-rotating rings specified in the standard topology of an FDDI LAN. Also, the distance limitations between nodes would be reduced from 2km to about 100m for shielded twisted pair and 50m for unshielded twisted pair — rendering the technologies less applicable to backbone configurations.

Many users, though, are more interested in high-speed backbone configurations to link their independent LANs than in direct connections. Jim Bloomquist, vice-president of statistical computing at A. C. Nielsen Co. in Northbrook, Ill., said, "We're now looking at 10Base-T [10M bit/sec. Ethernet over unshielded twisted pair] as a backbone. If suddenly we could do FDDI over copper, it might be cost-effective to move to FDDI more quickly."

Added Bradie, "If you could run your 16M bit/sec. token-ring at 100M bit/sec., you could upgrade your backbone without changing your wiring, offering a new migration path up from the IBM wiring scheme."

Synoptics' technology accommodates shielded twisted-pair (Type 1) cabling only, used mainly in IBM Cabling System installations. Chipcom has developed technologies for shielded and unshielded twisted pair.

Riess said that the 50-meter distance limitation could be a problem in older buildings because "you often don't even know where the wires go. Someone may have wrapped cable around a chair leg on the way to the wiring closet."

Migration to the emerging FDDI standard has been slow because of the high costs associated with electro-optic components, which are shipping in low volume, and the installation of fiber cabling.

"Our goal is to bring the current $11,000 FDDI per-node connection down by 50%," said Stephen Diamond, marketing manager at Synoptics. Fowler said Chipcom hopes to bring the $2,000 to $4,000 FDDI adapter card prices projected for 1994 to market in 1992 or 1993 by accelerating the volume of network interface card components, most of which remain the same for the FDDI and twisted-pair cards. He said that twisted-pair products could be available as early as nine months from now.

Chipcom and Synoptics intend to license their technologies to adapter card manufacturers, so acceptance by the FDDI standards committee is important for inspiring vendors to manufacture the cards.

> "OUR GOAL IS to bring the current $11,000 FDDI per-node connection down by 50%."
>
> STEPHEN DIAMOND
> SYNOPTICS

The alternative-medium concept parallels efforts spearheaded by Synoptics for allowing 10M bit/sec. Ethernet networks to run over unshielded twisted pair instead of its standard medium, coaxial cable. To that end, technology developed by Synoptics, Digital Equipment Corp. and 3Com Corp. was integrated and developed into a separate standard — 10Base-T — which was completed earlier this year by an ANSI working group. According to Fowler, there are now four million Ethernet/twisted-pair nodes.

CORRECTIONS

Eight of the 13 scheduled speakers from IBM did in fact speak at the Comdex/Spring '90 show [CW, June 11].

Lotus steps up Unix effort with 80386 versions

BY PATRICIA KEEFE
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. dropped more of its multiplatform shoes onto the desktop last week, releasing four Unix editions of 1-2-3.

The Lotus spreadsheet will run under AT&T Unix System V, Release 3.2 on Intel Corp. 80386-based computers. The four editions of 1-2-3 are for Unix System V/386 offerings from AT&T and The Santa Cruz Operation (SCO), SCO's Xenix System V/386 and Interactive Systems Corp.'s Unix System V.

These platforms kick off Lotus' System V drive because of their combined installed base, which totals 400,000, and mature distribution channels.

Other than support for AT&T Unix System V, the newest additions to the Lotus cross-platform strategy provide the same features as does 1-2-3 for Sun Microsystems, Inc., which shipped in April.

If these ports are successful, some analysts are expecting Lotus to offer a version for IBM's AIX. David Rome, Lotus' director of Unix products, said that Lotus will "investigate and support other versions of [Unix] as our users request it."

Lotus will also wait for Unix customers to indicate which graphical user interface needs to be supported.

In a separate announcement this week, Lotus plans to introduce an upgrade to the government edition of 1-2-3 Release 2.2. Key enhancements include a translation module to support several brands of Unix spreadsheets, the ability to print wide reports on dot matrix printers and an electronic tutorial called Easy Start.

Lotus will also launch an electronic bulletin board in August that will provide federal customers with product updates and support.

Senior product manager Alan Menard said a government edition of the Microsoft Corp. Windows 3.0-compatible 1-2-3 Release 3.1 will be forthcoming about 30 days after its commercial release this fall. It will include the same enhancements, plus a Datalens driver for the Microsoft/Sybase, Inc. SQL Server.

These introductions signal a renewed emphasis on the government market, where Lotus has found itself squeezed out of at least two major desktop contracts, either for not supporting Windows or Posix-compatible Unix.

While most of the government's 1.6 million installed base of personal computers is Intel 80286-based or smaller, Tom Ruff, Lotus director of federal systems marketing, said that 70% of government agency requests for proposals call for a 386-based Unix system.

Lotus is targeting 1-2-3 for AT&T Unix System V at multiuser installations. A single-user edition costs $695, the multiuser edition supporting 10 nodes costs $1,295, and more users may be added for $495 each.

Oracle, users call support truce

BY JEAN S. BOZMAN
CW STAFF

REDWOOD CITY, Calif. — A one-day meeting between top Oracle Systems Corp. executives and leaders of regional user groups produced the desired result last week: a truce that reduced simmering tensions about pricing policies and product support.

"People were pretty skeptical going in. But what they said — and the way they said it — changed our minds," said Richard Goth, a consultant at Cap Gemini America, Inc., who represented the Midwest Oracle Users Group.

The meeting held near Oracle headquarters last Thursday was the start of what Oracle calls its Affinity program for users. "They want to develop a relationship in which the users are regarded as partners," explained Tony Ziemba, president of the New York Oracle Users Group. Efforts to obtain comment from Oracle executives were unsuccessful.

According to users, Oracle promised in a written statement to do the following: Disclose confidential corporate information to the Affinity program members; respond to the top five product enhancements requested by users; and provide free access to a technical-support bulletin board on Compuserve. Executives also promised to respond quickly to emergency product support questions and aim for a 48-hour turnaround time.

Top executives made confidential disclosures about Oracle's business — and presented product plans and new support policies. However, they also demanded nondisclosure of confidential materials.

The Affinity program calls for quarterly meetings with the top user-group representatives, including a session at the September meeting of the International Oracle Users Group in Anaheim, Calif. Ziemba said the meetings stem from longstanding user pressure on Oracle executives to address product concerns.

"This user movement has come up from the grass roots," Ziemba said. "We can see that we're getting results, but we won't have a report card on the Affinity program until next year."

If you are presently using these systems, let IAM® reduce your Nightly Processing Time 50% to 80%

American Management Systems
CUFS (College Financial Systems)

American Software
General Ledger

Cyborg
Payroll

Computer Associates
CA7 – Banking Infopoint – CA11

TCC
Life 70

Data Design Associates
Financial Packages

Cincom
Mantis

HBO & CO
Hospital Applications

Group 1 Systems
Zipcode File

IBM
CICS – SMP/E
RMDS Netview DISOSS

Florida Software
Banking Applications

McCormack & Dodge
General Ledger, Payroll, etc.

Management Science of America
Accounts Receivable, Payable, etc.

Pansophic
Easytrive

Stockholder Systems
PEP+

In House Applications

IAM VS VSAM

IAM REDUCES THE SIZE OF YOUR VSAM FILES BY 30 TO 70%
IAM REDUCES VSAM EXCPs BY 50 TO 80%
IAM REDUCES VSAM CPU TIME BY 20 TO 40%

CICS and Batch applications make heavy use of keyed indexed VSAM (KSDS) files. VSAM is a prime bottleneck to the performance of these systems. IAM, a transparent alternative to VSAM, eliminates the VSAM bottleneck by slashing I/O and CPU time. IAM's Real Time Tuning monitors I/O activity, dynamically changing the number of buffers and I/O chaining. IAM completely eliminates the EXCPs to the VSAM index. IAM executes fewer instructions per record request. Batch processing times are dramatically reduced.

Call for a Free No Obligation
90 Day Trial
Supports MVS, MVS/XA and MVS/ESA
Makers of FDR and ABR

INNOVATION®
DATA PROCESSING
275 Paterson Avenue, Little Falls, NJ 07424 • (201) 890-7300

Salaries of IS jobs skyrocket

BY ALAN J. RYAN
CW STAFF

NEW YORK — Serious salary pursuers take note: Pay is on the rise in a big way for three information systems executive positions — systems planning and architecture chief, disaster recovery services chief and database development and administration chief.

According to a study of 31 major U.S. corporations conducted by Edward Perlin Associates, Inc., those three positions experienced average total compensation increases of 25% more this year as compared with last year and had substantial increases in base compensation as well. The study also revealed that in all, the top IS executives' total compensation climbed an average of 9.4%.

The executives responsible for systems planning and architecture concentrate their efforts on taking advantage of advancing technology. The disaster recovery services heads concentrate on averting and minimizing the effects of system catastrophes. Also, the database development and administration head is important as a focus for corporate efforts to make better use of the data in their systems.

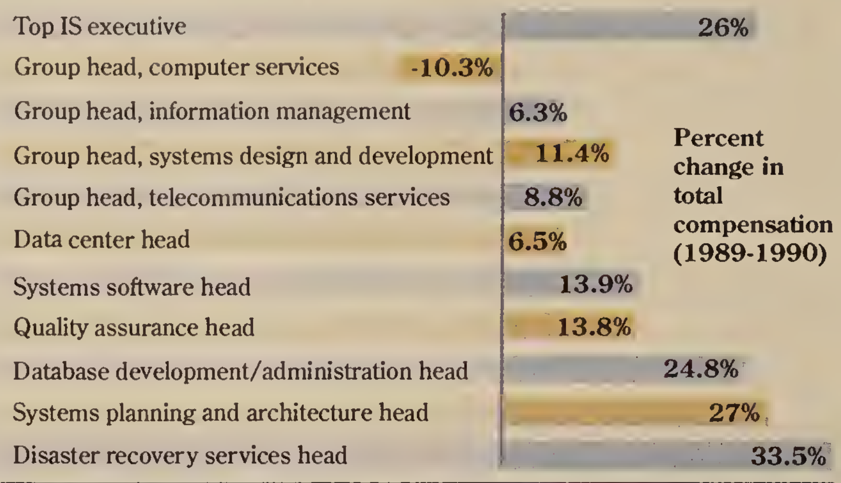
John A. Putney Jr., executive vice-president at Teachers Insurance & Annuity Association in New York, said the big increases in pay scales for the three areas mentioned in the survey may not be an accurate reflection of what is happening at his organization.

For instance, Putney said, his firm's database development and administration positions have traditionally been on the high end of the pay scale, and he did not recall any major changes this year over last. He did say the importance of the disaster recovery function has evolved from a systems perspective to an overall companywide perspective.

Roger O'Connor, a senior consultant at the management consulting firm, said the survey showed that compensation rates in the telecommunications area did not climb as rapidly during the latest survey period as they did several years ago. "The whole telecommunications field in terms of pay practices is starting to ease off a little," he said. "Salaries are not moving as aggressively as they used to three or four years ago."

Top dollar

The highest ranking IS executives are seeing hefty pay increases



Source: Edward Perlin Associates, Inc.

CW Chart: Doreen Dahle

OSI/Net Management protocols released

BY ELISABETH HORWITT
CW STAFF

NEW YORK — Some 100 computer and networking vendors met last week to release the first full set of network management protocols based on the Open Systems Interconnect (OSI) standard.

Some users with long-term OSI plans said they still see commercial, interoperable OSI-based network management products as several years away.

"There's a difference between having something on paper and having it in reality for us," said Tom Nakamura, product manager for engineering design networks at Hughes Aircraft Co., adding that the "interim, transition period will probably take years."

The OSI/Network Management Forum announced Release 1 of a full set of specifications for both fault and configuration management.

The forum fulfilled its goal of bringing out a working set of OSI management protocols well ahead of the official standards bodies, AT&T official William Gilbert said.

Hewlett-Packard Co., AT&T and MCI Communications Corp. were among the vendors that said they would comply with the standard sometime next year. However, users said that it would probably take a lot longer for them to start using those products as a foundation for multivendor network management.

"I think everyone agrees on the concept [of standardized network management], but the reality here is a lot of devices that don't talk the same protocol" to OSI specifications, said Keith Addison, manager of network integration at G. D. Searle.

"We can't have OSI network management until we build OSI networks, and that's still tough to do," Nakamura said.

Andrew Bach, director of communications engineering at Securities Industry Automation Corp., agreed that "seeing is believing" when it comes to standards-based interoperability. He added, however, that his company's Intel Corp. and Digital Equipment Corp. systems using the first four OSI layers "talked together almost at the first shot. We had to pick our jaws up off the floor."

Compaq to plug 386SX into laptop line

BY RICHARD PASTORE
CW STAFF

HOUSTON — Compaq Computer Corp. is scheduled today to unveil an SLT laptop computer based on Intel Corp.'s hot-selling 80386SX chip. Observers briefed by Compaq expressed disappointment that the chip will not debut in Compaq's popular LTE notebook family as well.

The new SLT is expected to include the IBM Video Graphics Array display and three-hour battery of its Intel 80286-based SLT predecessor. However, the model will be powered by the fastest SX processor on the market, will add 4K bytes of cache memory and will offer greater hard disk capacities (see chart).

Some SLT 286 users were unfazed by word of the SX version. "We're not constrained by the [286] technology at this point; I don't see it changing our buying habits," said William Harrison, senior vice-president of The Hartford Insurance Group in Hartford, Conn.

"Our SLT is perfectly adequate at this time," added Eric Gilbertson, manager of MIS at Uniroyal-Goodrich Tire Co. in Eau Claire, Wis.

One user pushing the limits of his SLT 286 units is Stephen Rood, a microtechnology manager at Coopers & Lybrand in New York. "It would be something we'd take a look at," Rood said of the SX model. However, he expressed dismay at Compaq's pricing, saying that with a discount, he could buy the more powerful Toshiba Corp. 5200 laptop for about $1,000 less.

Still, analysts said they expect the new SLT to do well. "It's going to be extremely competitive, and it will be just as popular as the SLT line has been in the past," said Will Fastie, editor of "The Fastie Report," a Baltimore-based personal computer newsletter.

Still, some analysts had hoped for an SX-based LTE, Compaq's trend-setting seven-pound notebook computer. "That's the machine that would have made me jump up and down," Fastie said.

However, a Compaq spokeswoman said the firm has yet to find a way to deploy SX technology in the compact LTE. "The system boards in the LTE are too small," she said. Some observers said Compaq should deliver an SX-based LTE in nine to 12 months.

Compaq is also scheduled to announce today availability of its first desktop unit using the 20-MHz 386SX. The box offers 4K bytes of cache, 2M bytes of memory and hard disk capacity options of 60M or 120M bytes. Prices range from $3,299 to $5,299.

Lap power

Compaq's latest laptop features the 20-MHz 386SX and hefty hard disk options

SLT 386s/20

CPU: 20-MHz Intel 386SX

Weight: 14 pounds

Memory: 2M bytes, up to 14M bytes

Cache: 4K bytes

Storage: 60M- or 120M-byte hard disk; 3½ in., 1.44M-byte floppy disk

Battery life: Three hours

Display: 10-in. monochrome VGA, backlit LCD display

Price: $6,799 to $7,499

Source: Compaq Computer Corp.
CW Chart: Marie Haines

Novell's 386 Netware goes for SAA

BY JIM NASH
CW STAFF

Novell, Inc.'s Netware Communication Services is a belated question mark for some information systems administrators and analysts. Others see it as a firm step for Novell into the large-company arena.

Introduced last week, Communication Services is a platform designed for Netware 386 Version 3.1 networks that will include long-awaited Netware Loadable Modules. One of the modules, Services for SAA, will provide network-to-IBM mainframe connectivity over existing IBM Systems Network Architecture backbones.

Gerry Machi, marketing director for Novell's communications products, said that Services for SAA provides "all the connections" between local-area networks and IBM minicomputers and mainframes. The software is scheduled for delivery this fall. Several users, some of whom are Novell beta-test sites, had yet to hear about it.

For IS managers, the software provides centralized network management and security on Netware's 32-bit operating system.

Two versions of the Systems Application Architecture (SAA) product will, respectively, support up to 64 and 254 simultaneous sessions, while another combination of modules has been tested with a total of 1,000 concurrent sessions.

Communication Services' reception by users was muted last week. Midway Airlines did not see an immediate need for the product. Bob Thompson, a systems analyst at Midway, said, "Right now, we've set up our own link to the Sabre system" mainframe operated by American Airlines. The Chicago-based airline runs all of its flight-control software from Novell LANs through Memorex Telex Corp. dedicated gateway PCs and to Sabre mainframes.

Frank Dzubeck, president of the consulting firm Communications Network Architects, Inc. in Washington, D.C., played down the announcement's significance in LAN-to-mainframe settings.

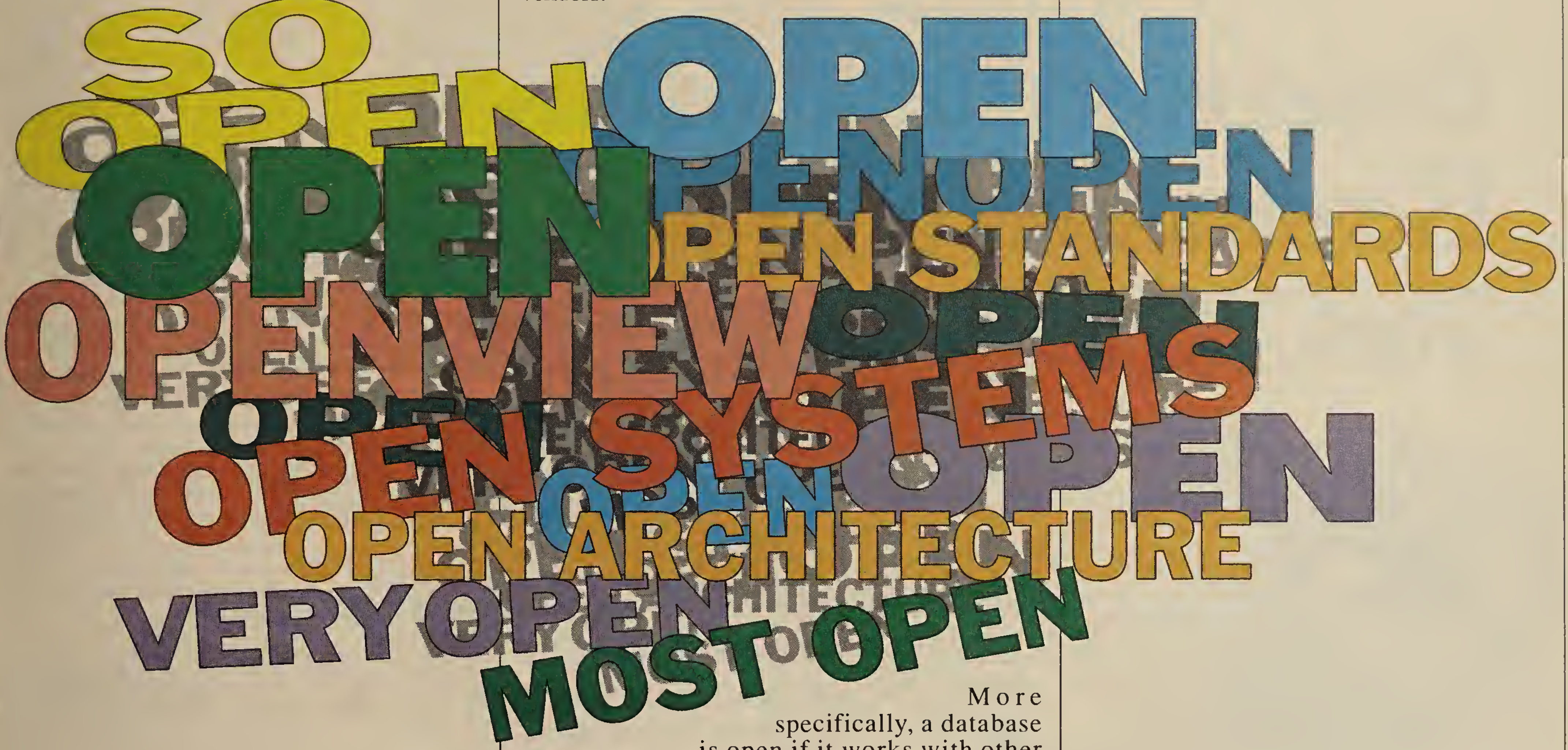
Services for SAA, Dzubeck said, "is in line with the other vendors' [communications] services." He and other analysts cited similar products fielded by IBM, Banyan Systems, Inc. and a joint product by Digital Communications Associates, Inc. and Microsoft Corp. Machi countered that Novell is the first to link 1,000 concurrent sessions.

Closing Arguments

Only ORACLE supports virtually every vendor's software, hardware and network.

Today, some software companies claim that their software products are "open." They may even graft the word onto their product names. It is a confusing situation, but a clear definition of "open" is finally emerging.

Software is "open" only if it adheres to industry standards and works with products from other vendors.

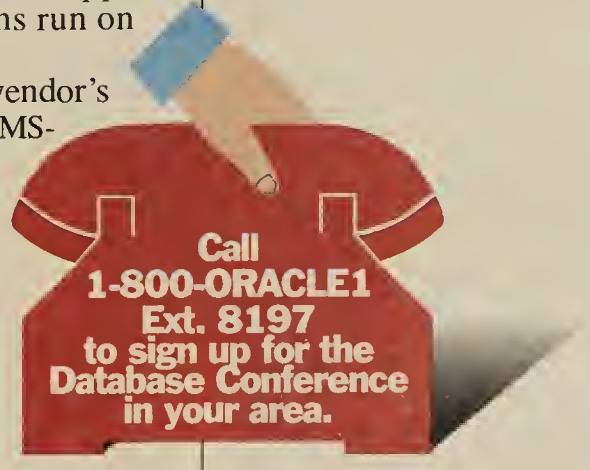


More specifically, a database is open if it works with other vendors' databases. For example, ORACLE provides access to IBM's DB2, SQL/DS and DEC's RMS.

An open database should also work with other vendors' applications. ORACLE works with DEC's All-in-1, DG's CEO, IBI's Focus and SAS. And it supports PC and Mac software like Lotus 1-2-3, WordPerfect, Borland's Paradox and Apple's Hypercard. Even Dbase applications run on ORACLE.

Software is open if it runs on every vendor's operating system. ORACLE runs on MS-DOS, OS/2, Mac OS, UNIX, VMS, MVS and virtually every other operating system on the market.

And software is open if it supports every vendor's network. ORACLE supports IBM's LU6.2, LAN Manager, NetBIOS, DECnet, Novell's SPX/IPX, industry standard X.25 and TCP/IP and many others.



Choosing open software today lets users choose any vendor's hardware, software and network tomorrow.

Call 1-800-ORACLE1 ext. 8197 to sign up for an Oracle Database Conference near you. And keep your software and your options open.

ORACLE®

Compatibility • Portability • Connectability

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

NSFnet hits the high-speed links

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — NSFnet, the network supporting nationwide research collaboration, began linking researchers and supercomputer centers at 45M bit/sec. last week — 30 times its previous speed, the National Science Foundation (NSF) announced.

Implementation of Phase 2 of the NSFnet project began on schedule, with six out of the network's 13 nodes due to migrate by year's end from 1.5M bit/sec. T1 links to 45M bit/sec. connections, the NSF said.

NSFnet is also gaining one T1 node and two T3 nodes by the end of the year, one of which will link to the New England Academic and Research Network, the NSF said. The foundation is allocating $7.9 million to the expansion.

The other seven nodes are scheduled for upgrade next year, according to NSF director of networking Stephen Wolff.

To support the new speeds, IBM developed a new packet-switch architecture, and MCI Communications Corp. will supply 45M bit/sec. network service — neither of which are available commercially (see story below).

The jump from T1 to T3 speeds is a crucial one, given the network's explosive growth during the past year in terms of both the number of nodes and the volume of traffic it supports, Wolff said. Network traffic has grown to more than three billion packets per month, compared with about 125 million packets per month in July 1988, when the T1 network was deployed, he said.

The network will enable a "whole new range of applications" whose bandwidth requirements had restricted them to systems in the same computer center, said Michael Levine, co-scientific director of the Pittsburgh Supercomputing Center.

Projects such as global climate modeling involve the regular exchange of complex calculations and visual data among researchers and computers that are looking at different aspects of the problem, Levine said.

Right now, researchers typically collaborate on such projects by "sending a truck full of magnetic tapes," Levine said. "They want to bring turnaround time down from a matter of days to a matter of minutes."

This should begin to be possible with the 45M bit/sec. links and even more so with multigigabit/sec. connections for which research funding was recently allocated, Levine said (see story page 61).

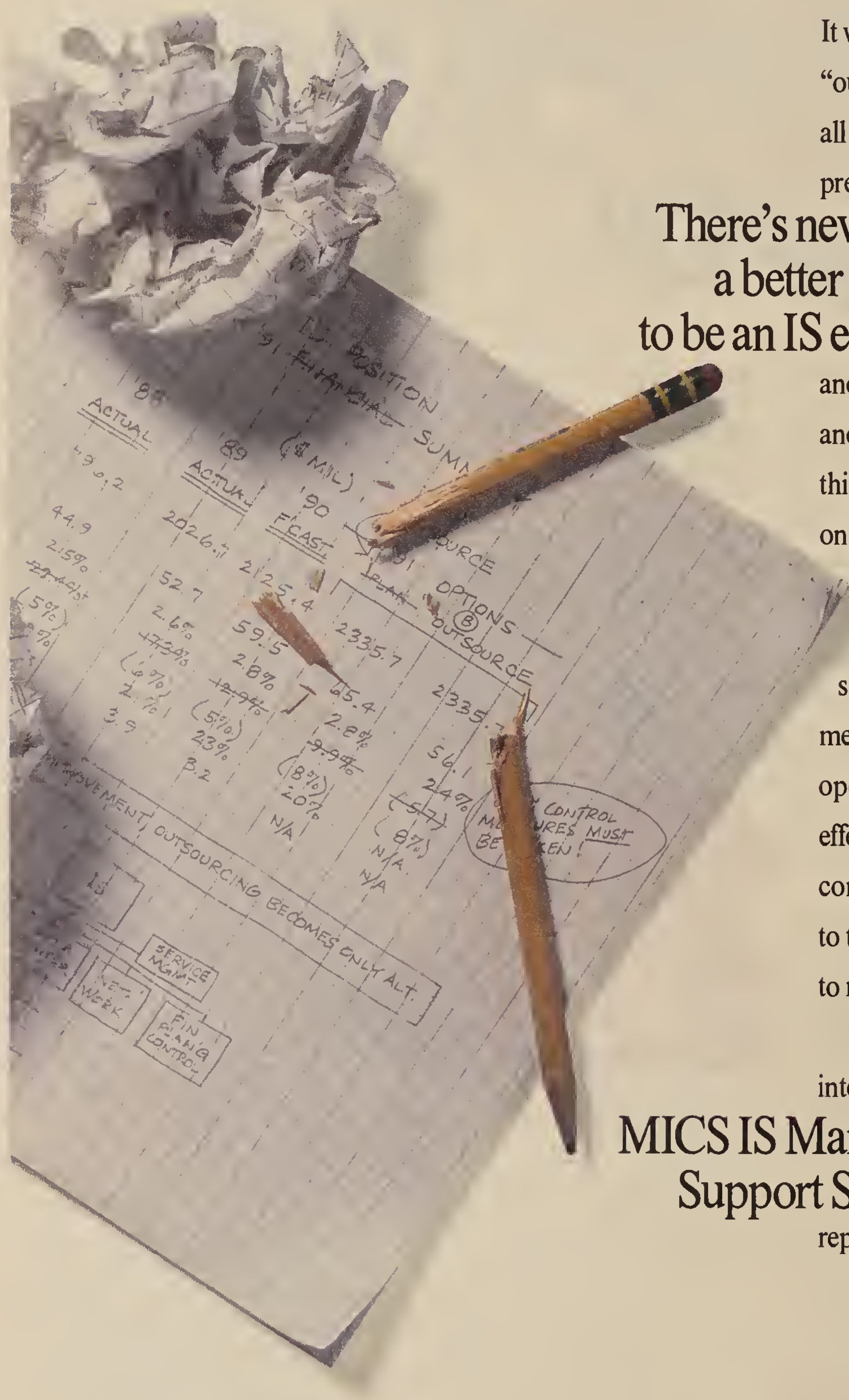
Switched off

IBM essentially had to junk the packet switch it had originally developed for the National Science Foundation and provide "a whole new generation of technology" to support 45M bit/sec. rates, said IBM executive Frank R. Moore.

NSFnet's old packet-switching nodes comprise multiple IBM RT workstations, each of which handles a single T1 link.

The new packet switch, with 50 times more throughput, is a single IBM Micro Channel Architecture (MCA)-based microcomputer, which can be either a RISC System/6000 or a Personal System/2 running AIX, and is equipped with multiple Busmaster cards.

Each MCA card controls either a 45M bit/sec. T3 link over MCI Communications Corp.'s network, or a 100M bit/sec. Fiber Distributed Data Interface link that allows the packet switch to act as an interface between NSFnet and an FDDI campus network.


'91 FINANCIAL SUMMARY
'90 FCAST
OUTSOURCE
OPTIONS
OUTSOURCING BECOMES ONLY ALT.
CONTROL MEASURES MUST BE TAKEN!

IS customers are up in arms.
IS costs are out of control.
The CEO wants to outsource.

It wasn't that long ago when the CEO didn't know what "outsourcing" meant. Let alone what IS was doing. Well, all that's history. Because today, you're under increasing pressure to control costs *and* keep customers happy.

There's never been a better time to be an IS executive.

To respond, you must simultaneously manage heterogeneous computing and network configurations, contain and reduce IS costs, manage IS customer expectations, and capitalize on rapidly changing conditions. To do all this, you need accurate, timely, integrated information on costs, workloads and service levels. In other words, you need MICS from LEGENT.

MICS is the *only* comprehensive management solution available to IS executives. It's designed to measure and report on *all* aspects of your IS operation, allowing you to document the efficiency and effectiveness of your department. MICS also lets you compare the costs and performance of outside vendors to the in-house organization, so you're better prepared to respond to any outsourcing initiatives.

Remember, only MICS can provide the integrated IS management information you need to prosper in these tough times. To learn more, call your LEGENT account representative or call 1-800-877-8678.

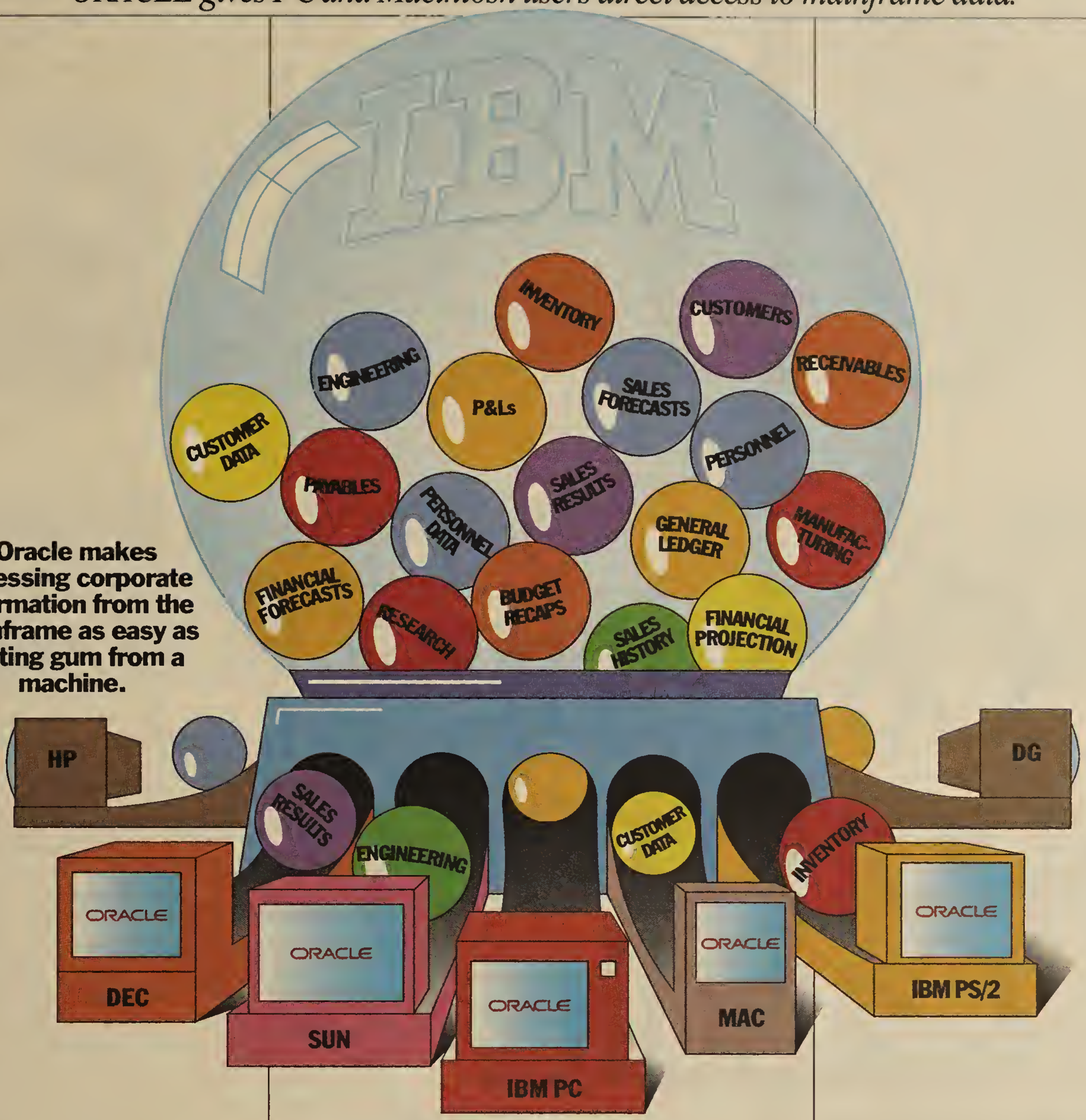
MICS IS Management Support System

LEGENT

MICS operates in all MVS environments.
©1990 LEGENT All rights reserved. LEGENT is registered in U.S. Patent and Trademark Office.

Taking DB2 data to the desktop

ORACLE gives PC and Macintosh users direct access to mainframe data.



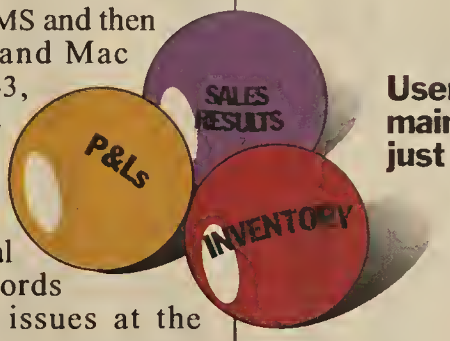
Oracle makes accessing corporate information from the mainframe as easy as getting gum from a machine.

Many large companies are wasting millions of dollars worth of vital business information. Data critical to their operation is isolated from the employees who can really use it, locked away in the mainframe database.

ORACLE® provides a direct link between the data users need and the PC and Macintosh applications they already know how to use.

Users can query and update DB2, or other databases such as IBM's SQL/DS or DEC's RMS and then manipulate the data using PC and Mac applications such as Lotus 1-2-3, Hypercard, 4th Dimension, ORACLE for DBASE and Professional ORACLE.

And while users put the data to work, MIS departments still have total control over security and passwords because they determine access issues at the mainframe.



Users can update the mainframe from the PC just as easily. To learn more, call now. 1-800-ORACLE1 Ext. 8101.

Oracle backs all of its products with the largest database service and support group in the world. If not satisfied, users can return ORACLE in 30 days for a full refund.

Professional ORACLE Tools and Database cost $1299. The ORACLE Tools alone are $799. ORACLE for 1-2-3 and ORACLE for DBASE are just $299. And ORACLE for Macintosh is $699. All come with full phone installation support and the 30-day guarantee.

Call 1-800-ORACLE1 ext. 8101 and turn your company's most valuable commodity into its most productive asset.

ORACLE®

Compatibility · Portability · Connectability

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. 4th Dimension is a registered trademark of Acius Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

Racal-Interlan at end of its LAN Manager rope

BY JOANIE M. WEXLER
CW STAFF

BOXBORO, Mass. — Unable to see the light at the end of the LAN Manager tunnel, Racal-Interlan recently pulled the plug on products aimed at interconnecting Microsoft Corp.'s fledgling network operating system with Novell, Inc. Netware local-area networks. The company also dismissed the 15% of its work force associated with the products.

The networking firm's LMN Server, which allows Netware clients to log on to LAN Manager 1.1 file servers, and a prototype product allowing the reverse process have both been aborted, although they were rolled out only last February.

"We had to make a cold, hard [return on investment] judgment here," explained Dave Tolwinski, Racal-Interlan's vice-president of marketing. "LAN Manager didn't develop as rapidly as we thought it would, and thus neither did the market for LAN Manager/Netware interoperability."

No commitment

"Everyone was delighted to hear we were developing the LAN Manager/Netware products, but no one was willing to commit to using them," he added.

Tolwinski explained that Racal-Interlan perceived structural changes in the market as inhibiting the takeoff of LAN Manager, which runs with Microsoft's OS/2 operating system. One change, he said, was Microsoft's recent decision to depart from its OEM-only distribution philosophy and sell LAN Manager directly.

"We think this will create additional confusion in the market and slow down LAN Manager sales," he said. Tolwinski also cited as a stumbling block Compaq Computer Corp.'s recent reversal of a decision made in February to resell LAN Manager.

Bob Nerz, Racal-Interlan's software product line director, added, "LAN Manager 2.0 [which takes advantage of Intel Corp. 80386-based computers] won't be shipping in high volume until 1991 sometime," a year behind schedule.

Nerz noted that the LAN Manager products may be licensed to another party and that negotiations are under way with vendors who might take over the projects.

Coming soon from Candle: a CICS monitor that will make headlines.

Candle®

Suits charge phony MS-DOS

BY CHARLES VON SIMSON
CW STAFF

REDMOND, Wash. — Microsoft Corp. and Everex Systems, Inc. have filed civil charges against a group they claim introduced more than 30,000 counterfeit copies of MS-DOS into the U.S. market, the firms announced last week.

In a series of lawsuits, the first of which was filed under seal on April 6, 1990, the two companies jointly alleged that a total of 16 individuals and business entities in New Jersey and Northern California were engaged in the manufacture or sale of a counterfeit of the Microsoft MS-DOS product marketed by Everex under the trademark Parcorp.

"These lawsuits are part of a vigorous antipiracy campaign by Microsoft," said William Neukom, the firm's vice-president of law and corporate affairs. In addition to pursuing civil suits, the two firms said they will make any evidence gathered available to the U.S. Attorney and the FBI for possible criminal investigation.

The process began in late March when Everex officers learned that a stand-alone version of Parcorp was being sold in some retail outlets. The company does not sell a stand-alone version of the software.

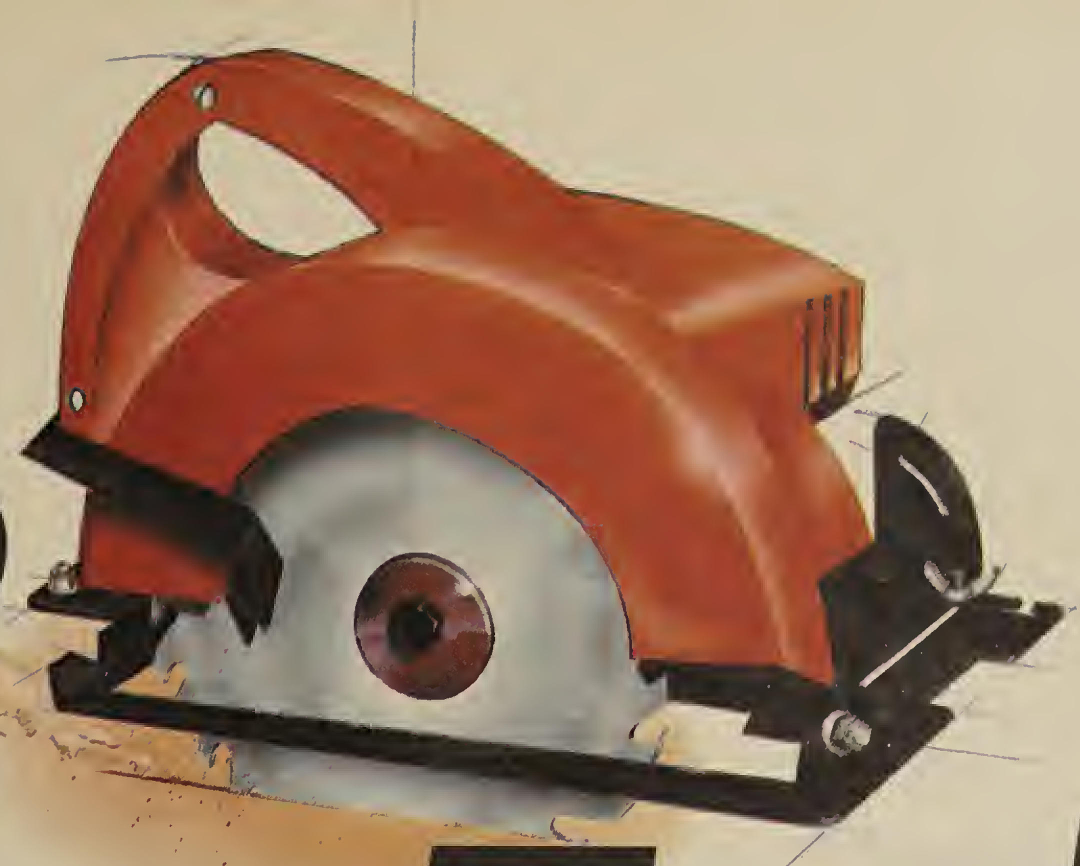
After Everex consulted with Microsoft, the suits were filed and seizure orders were issued to confiscate merchandise from six locations in New Jersey and California between April 10 and May 8.

Business records and more than 1,000 units of allegedly counterfeit products were seized. Several thousand additional units of product and promotional artwork were subsequently turned over by four of the defendants in response to an order issued by U.S. District Court Judge Charles A. Legge.

"We have an extremely strong case and at the moment intend to prosecute all defendants to the full extent of the law," said Debra Vogt, Microsoft senior paralegal.

Persons named as defendants are Joe Fok of San Jose, Calif.; Benny S. Lee, Norman Chan and Susan Chan of Fremont, Calif.; Thomas Wu, Michael Wu and Frank Ho of Edison, N.J.; and Tai Yen Chu, Robert Young and Christi Liang, corporate officers of San Jose, Calif.-based Asia Source, Inc. None of the defendants could be reached for comment.

Because Everex does not sell a standalone version of Parcorp, any versions of the product lacking an Everex system are likely to be counterfeit, the company said. The allegedly bogus product looks very similar to the authentic version but lacks a bar-code or date-code sticker on the package, according to Everex.


DB2 Power Tools

Maintaining IBM's DB2 data base management system at peak performance is not an easy task. As your system grows, sustaining maximum functionality and efficiency will become more and more difficult. However, with the right kind of help, the job becomes infinitely easier. DB2 Masterplan™, BMC Software's complete line of high performance DB2 products, contains the power tools to help you administer your DB2 system at its highest level, even as the environment becomes more demanding.

DB2 Masterplan products are built tough, to withstand the rigors of a fully functioning DB2 system, and their versatility promises smooth, easy-to-use operations in your initial start-up of DB2 and under the most trying conditions. As your company's level of sophistication in the use of DB2 grows, you'll find that DB2 Masterplan is increasingly valuable to you. The more you demand, the more these power tools deliver.

With BMC's new Easy Install System (EIS), you can install DB2 Masterplan products in about an hour. In addition, because of the extensive online documentation for EIS, there is no need to refer to manuals during an installation.

DB2 Masterplan includes the following products:

- DB2 MASTERMIND™

  DB2 CATALOG MANAGER—For performing DB2 administrative functions. It's interactive, intuitive and easy-to-use.

  DB2 ALTER™—Complete support for changing, copying and migrating DB2 data structures.

  DB2 DASD MANAGER—Manages DB2 physical data sets.
- DB2 REORG PLUS—Reorganizes DB2 data bases twice as fast.
- DB2 COPY PLUS—Significantly reduces time and cost to make image copies.
- DB2 ACTIVITY MONITOR—Online information to control DB2 performance.
- DATA PACKER™/DB2—Reduces DASD requirements and improves performance.

THE HIGH-PERFORMANCE TOOLS TO HANDLE A TOUGH JOB

For more information, or to begin a 30-Day-Plus Free Trial of any of these products, call BMC Software, Inc., The Complete DB2 Company™, at **1-800-841-2031.**

BMC Software, Inc.
P.O. Box 2002 Sugar Land, Texas 77487-2002 713-240-8800

BMC has subsidiary offices in:

Australia	England	France	Italy	Japan	Spain	West Germany
(61) 3 819-6733	(44) 276 24622	(33) 1 48 77 77 77	(39) 2 48193850	(81) 3 837-8651	(34) 1 572-03-60	(49) 69 664060

IBM is a registered trademark of International Business Machines Corporation
DB2 is a trademark of IBM Corp.
© 1990 BMC Software, Inc. All rights reserved.

IBM Business Partner

BMC SOFTWARE

Candle offers status monitor for VTAM

BY JEAN S. BOZMAN
CW STAFF

LOS ANGELES — Candle Corp., which makes its $130 million in annual revenue selling performance monitors for IBM system facilities, announced last week that it had tapped a new market: IBM's VTAM network management software.

The new product, Omegamon for VTAM, applies Candle's monitoring technology to VTAM, a subsystem of IBM's MVS mainframe operating system. In time, Candle intends to consolidate its performance packages for IBM CICS, IMS, DB2, VM and VTAM on a single system console, Candle Chief Executive Officer Aubrey Chernick said.

"The status monitor is our hub," Chernick said. "It will pull together all our products so that an enterprisewide network can be managed from one place."

Tuning tool

Omegamon for VTAM is, in effect, a tuning package, product manager Mary Ann Armstrong said. It analyzes raw performance statistics, which are automatically collected by VTAM, and displays the results so that system memory can be reallocated to reduce system bottlenecks.

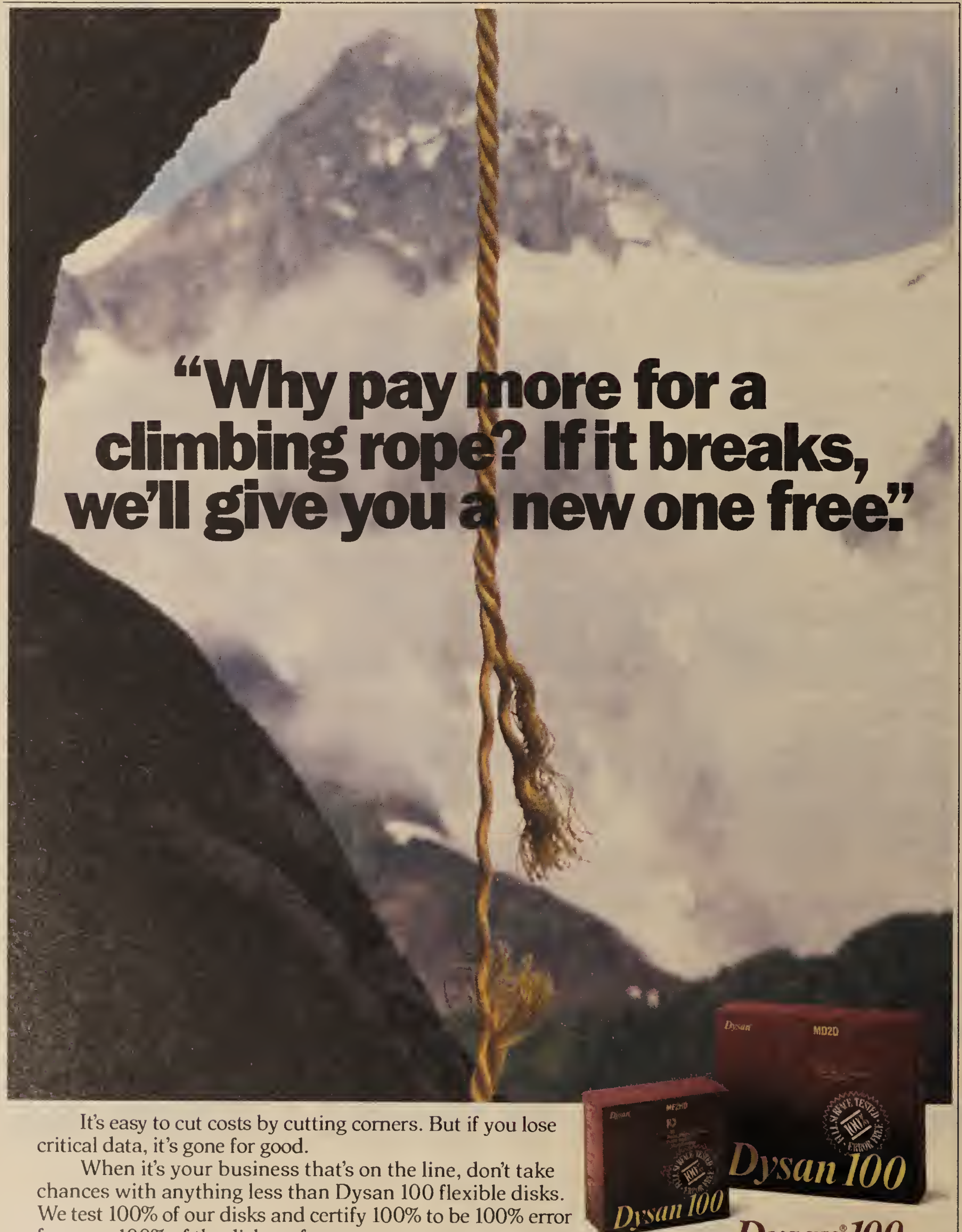
"Before this, we had no tools that would give us that information," said Wahid Abdelnour, senior systems programmer at Home Savings of America F.A. in Irwindale, Calif., which has been beta-testing the product for two months. "Now, we can tell how much memory VTAM is using for its buffers and which applications are using that memory." The Home Savings branch operation uses VTAM on two IBM 3090 machines to communicate with other regional offices.

Industry analysts said VTAM, which is nearly 20 years old, has acted as a "black hole" that allowed some applications to drain system resources. However, network managers — even those trained by IBM in tuning techniques — often cannot identify resource-hungry applications without a lengthy system trace.

"IBM gives you the tools to tune VTAM, but they don't give you the VTAM performance statistics you need to do the job," said Bill Strapko, senior software analyst at International Data Corp. in Framingham, Mass.

Among the new package's major features is a virtual-route analysis module, which sends alerts if network traffic exceeds preset levels.

There is also a hot-key to IBM's Netview network manager, so operators can simultaneously monitor VTAM response times and Netview system alerts. Console displays show a variety of parameters on color-coded screens, along with windows and pull-down menus. Among the parameters displayed are tuning statistics, response-time analysis and buffer-pool status.



"Why pay more for a climbing rope? If it breaks, we'll give you a new one free."
Dysan
MD2D
Dysan
MF2HD
Dysan 100
Dysan 100
It's easy to cut costs by cutting corners. But if you lose critical data, it's gone for good.

When it's your business that's on the line, don't take chances with anything less than Dysan 100 flexible disks. We test 100% of our disks and certify 100% to be 100% error free over 100% of the disk surface.

The Dysan 100. It's not just a name. It's a measure of superiority.

Dysan® 100
100% Better

CGI steers CASE toward networks

BY ROSEMARY HAMILTON
CW STAFF

BOSTON — CGI Systems, Inc. took its first step away from the mainframe last week with the introduction of a local-area network-based computer-aided software engineering package.

At the same time, the software company reiterated its commitment to IBM's AD/Cycle and said it will eventually migrate users to IBM's repository from the CGI one.

One early user, who had been running CGI's mainframe-based package called Pacbase, said Paclan allowed him to offload development from the host system and make the tools more available to users.

"It brings the tools closer to the developers," said Francois deBeck, director of systems development at the Department of Communications for the Canadian government. "I've seen a difference in attitude of my staff. We are doing a better job than we used to do before because the environment is separate from the mainframe."

CGI will target users who want better response time, do not want to compete for mainframe resources or wish to keep development separate from other processing, company officials said. However, a user can also license a Paclan version that hooks into the host-based system.

The stand-alone version would run on an IBM OS/2-based server and support both IBM Personal Computer and Personal System/2 workstations.

Unlike some other vendors, CGI is not positioning its products as AD/Cycle alternatives. Instead, it calls these products a preliminary step and said it will eventually help users migrate to the IBM repository.

The plan is to make CGI's repository consistent with the IBM plans, which would make the migration smoother, said Dick Ramsdell, chief executive officer. Once users make the move to the IBM repository, they can continue using the CGI tools.

©1990 Wang Laboratories, Inc.

THE WAR'S OVER.

And you've won.

Most technology companies—including us—have spent the last 10 years or so trying to beat the living daylights out of each other.

But who really got hurt in the crossfire?

Customers.

Business people who just had a job to do, but were forced to choose sides, not solutions.

That's why we're revolutionizing the focus of our entire company. And sending hundreds of applications engineering teams to work side-by-side with our customers.

We're looking toward you now. Not over our shoulder at IBM or anybody else.

We're looking at the way you work. The jobs you do. The problems you face. The goals you have. The answers you need.

And we're looking with an open mind.

The new Wang will create solutions based on your needs, not only our technology. Solutions that add value to established standards wherever possible, be it IBM, UNIX, Wang VS or whatever.

But let's not kid each other. We're no saints in business suits.

We're in this to win, just like anyone else.

But unlike anyone else, we know the only way we win, is if you win.

LET'S GET TO WORK. WANG

Tom bought Hewlett-Packard long

before he bought PCs.

When he got his first job on Wall Street, Tom's HP calculator was his most valued possession. It was the combination of innovation and reliability that gave him an edge. So when his Information Systems Manager recommended they go with Hewlett-Packard personal computers, Tom needed no convincing.

With Intel 286, 386, and 486-based models, HP's line of Vectra personal computers suits a range of business needs. Vectra PCs easily accommodate expansion. You can get up to 8 accessory slots, 1.3 gigabytes of hard disk storage, and 64 Mbytes of RAM. And all models accept both 5.25″ and 3.5″ disks.

Beyond this, HP's adherence to industry standards ensures compatibility. Now, and into the future.

But the most important feature is one that Hewlett-Packard has offered for 50 years. Exceptional quality. This, along with HP's extensive network of trained, authorized dealers, gives you all the assurance you need.
For the dealer nearest you, call **1-800-752-0900, Ext. 282J.**

There is a better way.

HEWLETT
PACKARD

Intel 486 is a trademark of the Intel Corporation.
©1990 Hewlett-Packard Company
CPPCC912

ADVANCED TECHNOLOGY

TECH TALK

Windows on work

Computer users who spend their time peering into a graphical user interface generally are more productive, less frustrated and use more features of their software, according to a study sponsored by Zenith Data Systems and Microsoft Corp. The two companies set out to compare character-based and graphical user interfaces by observing both novice and experienced users. The results of the study indicated that graphical interface users work faster, complete tasks more accurately and experience less fatigue, among other benefits. Chalk it all up to the "navigation theory," which holds that the intuitive icons and menus embodied by graphical user interfaces promote use, exploration and retention of functions in one or more applications — making users more productive and confident, the companies claimed.

……

Big word for a chip

Toshiba America Electronic Components, Inc. recently introduced what it claimed is the industry's first 1M-bit dynamic random-access memory (DRAM) with a 16-bit word width. The new 64K by 16 device is ideal for personal computer and laptop graphics applications, allowing designers to reduce component count from eight to two and increase reliability, according to Avo Kanadjian, DRAM product marketing manager at Toshiba. The devices are available in byte-write and write-per-bit versions with 80- or 100-nsec access times. Low-power versions are also available, Toshiba said.

……

They see it coming

Imaging process business will grow explosively in the early 1990s, according to the Association for Information and Image Management. Industry revenue is expected to climb from $3.3 billion in 1988 to $12.7 billion by 1993. It projects that more than half of the 1993 revenue, about $6.88 billion, will be electronic imaging.

Is a wedded PC-TV in your future?

Despite hubbub, some call HDTV overrated and see PC-TV hybrid as the next wave

BY MICHAEL ALEXANDER
CW STAFF

Much has been made of high-definition television (HDTV), the technology that promises to bring 35mm film-like pictures and compact-disc fidelity to home TV viewers. But when HDTV finally debuts in the U.S., the technology will be too late, and in its place will be the "telecomputer," a hybrid television set and personal computer, said several experts who believe that HDTV is much ado about nothing.

"Today's computer already has higher image quality than today's TV set," said William Welty, an analyst at Volpe, Welty & Co., a San Francisco investment firm. "TVs and computers are different in only one regard: Bit mapping allows computers to control an image, while today's TV sets merely display an image. The processing power required to control an image is substantial, and it is in this area that we believe major strides are being made that will blur our mental paradigms of the two mediums."

The many supporters of HDTV, which include a consortium made up of IBM, Apple Computer, Inc., Hewlett-Packard Co. and several other computer companies, have promoted HDTV as the cornerstone in a new generation of computer and consumer electronics products.

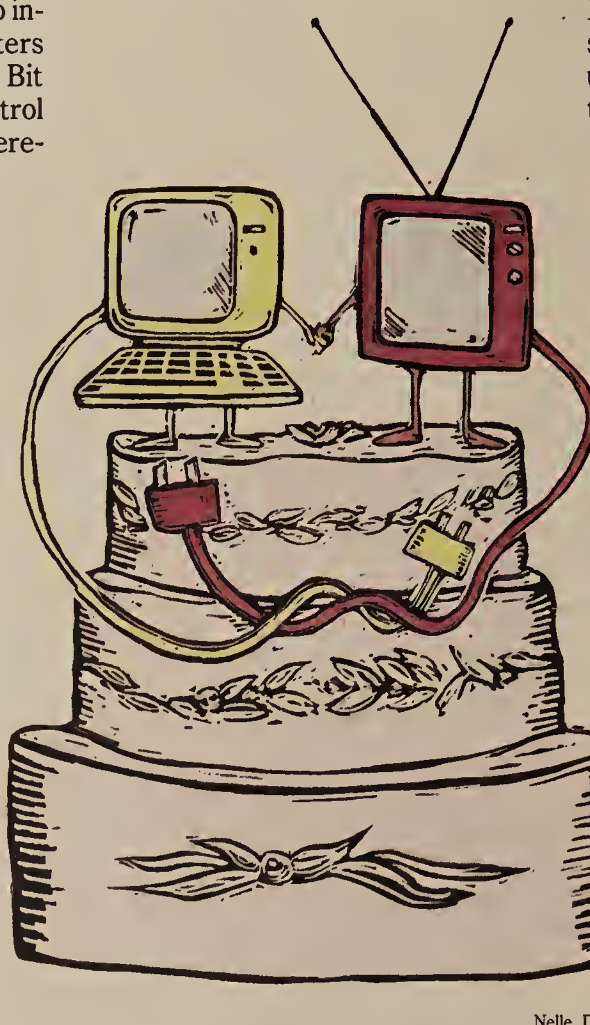
"HDTV is more than just another pretty TV picture," a report on HDTV released by the U.S. Office of Technology Assessment concluded last week. The development of commercial HDTV is linked to several information-age technologies, including digital processing of real-time video; high-performance displays; fast, high-density magnetic and optical data storage; technologies for packaging and interconnecting integrated circuits; and more.

Many experts said they think HDTV's potential technological and economic impact has been exaggerated. The television set of the future will be more like a PC, complete with a PC's expansion capabilities, many experts said. Researchers at MIT's famed Media Laboratory in Cambridge, Mass., have been promoting such an "open-architecture TV" for several years, for example.

HDTV is already obsolete because it is based on analog technology developed more than 50 years ago, MIT's researchers and others have argued. The future is in all-digital interactive TV, with which home and office directors will be able to reshape video images any way they wish, rather than merely passively sitting by as couch potatoes, they said.

"HDTV is a digression," said Glorianna Davenport, assistant professor of media technology at MIT's Media Lab. At a recent conference on digital multimedia, Davenport said users will have a computer-television capable of scaling and reconfiguring images and taking disparate video bits called "motion picture icons" and linking them in a browser, much in the same way that an Apple Macintosh user might create programs with Apple's Hypercard.

Among the early business applications for a telecomputer will be video electronic mail, messages delivered by talking heads via local-area networks, said Martin Duhms, president of New Media Graphics in Billerica, Mass.


Nelle Davis

"If you want higher resolution, there are many ways to skin the cat," Duhms said. "HDTV is the brute force way, where you double or triple the number of pixels on-screen. Another way is to process images so that low resolution looks better."

Digitizing a National Television Standards Committee signal, the TV standard used in the U.S. and Japan, and displaying it in real time on an IBM Video Graphics Array monitor would offer a considerable improvement over today's ordinary TV sets, Duhms explained.

Applications such as video E-mail, videoconferencing and video phones, with the PC as the platform, will begin appearing on the market within two years, Duhms added: "HDTV is a sideshow that is probably many years further away."

Though the telecomputer is still years away, the future of HDTV, at least in the U.S., is no longer as bright as the pictures the technology is capable of delivering.

"HDTV has gotten enormously negative press," said Lawrence Kaplan, vice-president and general manager of the visual systems group at Tektronix, Inc. "There is an incredible lack of understanding; people think that it is [for watching] *Gone With the Wind* at home. I have grave concerns for our future."

In April, the Defense Advanced Research Projects Agency (DARPA) announced that much of the $30 million that it had earmarked for HDTV research had been diverted to other projects. The same month, Craig Fields, DARPA's deputy director and a staunch supporter of HDTV, resigned under pressure from the Bush administration.

Late for an important date

The Federal Communications Commission has said it will not select an HDTV standard until the spring of 1993. However, a group of U.S. broadcasters called the Advanced Television Testing Center that banded together last year to test HDTV equipment has repeatedly postponed the start of testing, thus making it unlikely that the FCC will be able to stick to its timetable.

HDTV systems aim to sharpen TV pictures by at least doubling the number of scanning lines that make up TV images. In Japan and the U.S., TV pictures are composed of 525 scanning lines, and those in Europe are made up of 625. HDTV would put as many as 1,250 lines on-screen.

The FCC has already ruled that an HDTV system must be compatible with television sets already in use and stay within the 6-MHz band that TV channels now use.

To get around the limitations imposed by the FCC, several companies are proposing HDTV systems that would simultaneously broadcast HDTV signals along with ordinary signals, using channels that would be kept vacant for the purpose. Viewers with HDTV sets would tune to those channels to watch HDTV broadcasts.

To squeeze the 30-MHz signal bandwidth of an HDTV signal into the 6-MHz band, HDTV advocates are planning to digitize at least part of the signal and compress it before broadcasting.

The FCC's compromise solution will ultimately favor tomorrow's interactive TV, Welty said. Once the signal has been digitized, it could be viewed and manipulated on a television-computer.

Beware of one-dimensional 800 networks.

Unlike US Sprint's "flat" network architecture, AT&T's 800 Network provides more alternative routes and technologies so you'll never find yourself flat out of luck.

When it comes to 800 service, AT&T's concept of reliability is quite a bit different from Sprint's.

While Sprint® prides itself on its 100% fiber optic network, or "flat" architecture, we see this lack of diversity as a lack of reliability. For example, in some cities such as San Francisco, Sprint's 100% fiber optic network has no built-in routing alternatives in the event of a fiber cut. And that could leave Sprint customers flat out of luck.

AT&T, on the other hand, views a reliable 800 service the same way we view the world—as being well-rounded.

AT&T's 800 Service is unsurpassed in diversity and depth of protection. The AT&T Network has more miles of fiber and integrated technologies to deliver a level of call completion* unsurpassed by any long distance network. In fact, even if your 800 service is disrupted because of a problem with your own equipment, only the AT&T 800 Assurance Policy guarantees to get you back in touch with your customers within one hour.

What this means is that we have more ways to get your 800 calls through than any other network. Especially a one-dimensional, "flat" network.

So when you take a broad view of the world, you can see there's a world of difference between AT&T 800 Service and any other.

And that's the flat-out truth.

To discover a new level of reliability, just call the most reliable network in the world—AT&T.

Reliability.
Another AT&T advantage.

For more information, call your AT&T Account Executive or 1 800 222-0400.

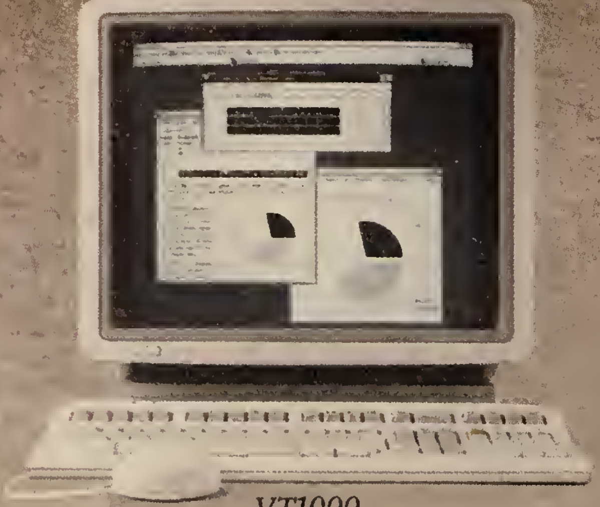
AT&T
The right choice.

© 1990 AT&T

*Call completion results based on domestic 800 services.

US Sprint is a registered trademark of US Sprint Communications Company Limited Partnership.

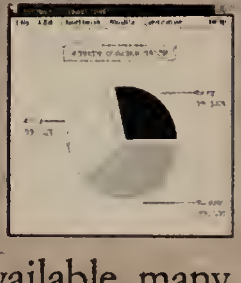
There's been a breakthrough



VT1000

The VT1000 terminal gives your users the power of windows. At a price that won't leave you broke.

For years, Digital has set the standards for terminals. And the VT1000 is our most advanced yet. The key is windows.



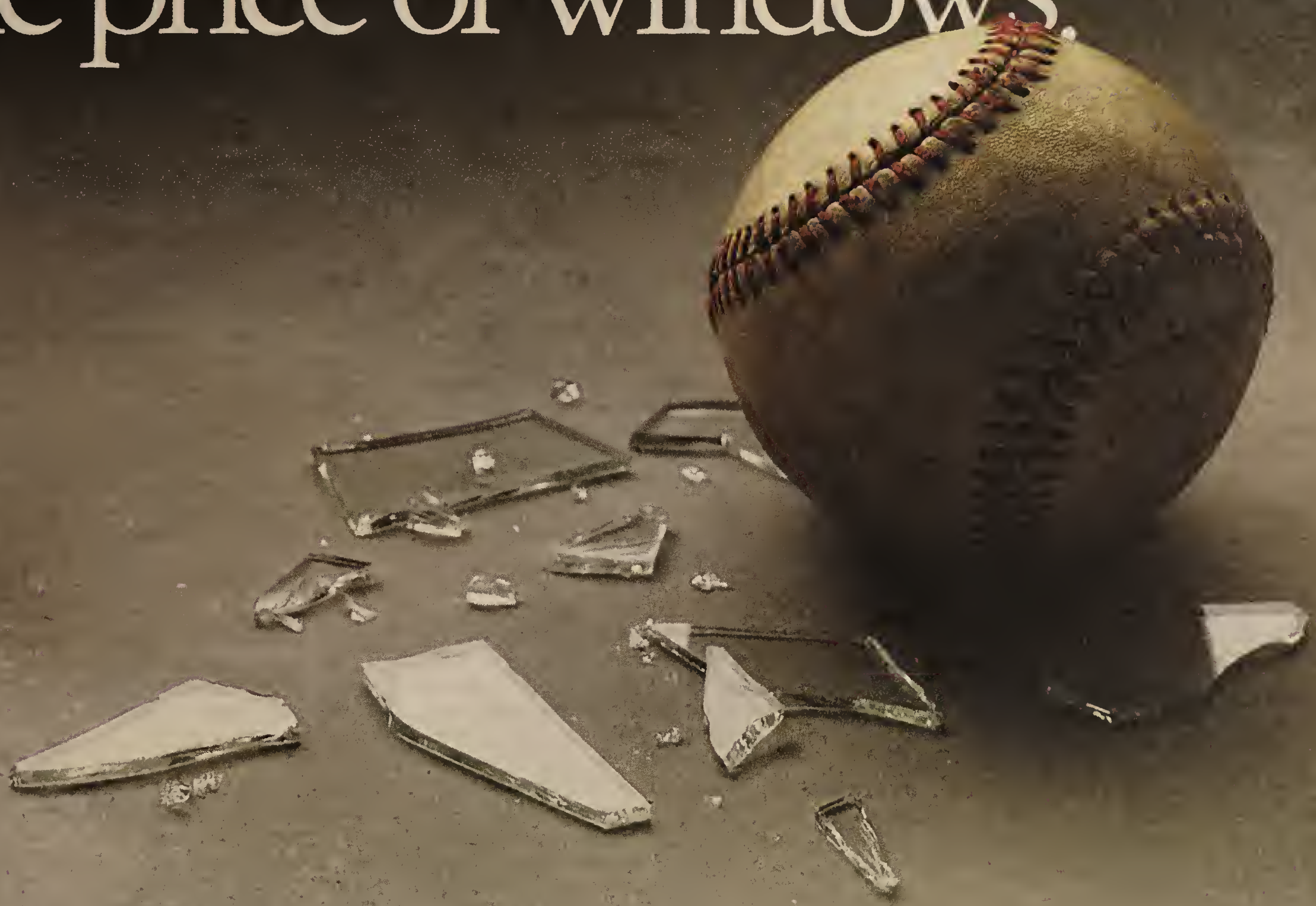
The VT1000's windows let your users work with several VT applications at once. In fact, thousands of VT applications are available, many of which you may already have.

That helps make the VT1000 a terrific investment. Your users will become more productive. And you won't have to spend a cent on software or retraining.

In addition, the VT1000 is compatible with the X Window System™ standards. So your investment will still

digital™

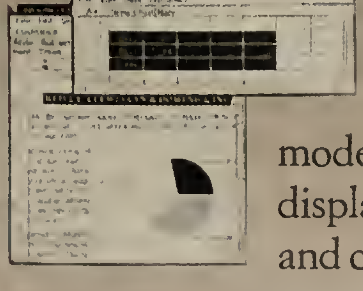
in the price of windows.



be good if you need compatibility with the X Windows environment.

And the VT1000 connects directly to your network with no need for a terminal server. So any VT application on the network is just a point and click away.

The VT1000 comes with a choice of high-resolution monitors. So whether you choose the 15-inch or 19-inch model, anything you display will be clear and crisp.



Digital's VT1000. The only VT with windows. And at a price you've got to see. To find out more, call 1-800-343-4040, ext. 387.

Digital has it now.

© Digital Equipment Corporation 1990. The DIGITAL logo, Digital has it now and VT1000 are trademarks of Digital Equipment Corporation. X Window System is a trademark of the Massachusetts Institute of Technology.

EDITORIAL

Easy does it

THE COMING OF AGE for any industry trend seems to be when a market researcher declares it to be a potential $10 billion market. Outsourcing is the latest phenomenon to reach that milestone. One market research firm has already pegged 1994 as the year when users will contract out their data processing operations to third parties to the tune of $10 billion. Of course, forecasters in the past have put forth similar glowing outlooks for videotex, home computing, compact disc/read-only memory and other underachievers.

We don't mean to belittle optimistic predictions or say that outsourcing won't be a major trend, but the issue needs to be put in perspective. Clearly, outsourcing has become a mandatory consideration for users looking to cut their information systems costs. When such Fortune 100 companies as Eastman Kodak and H.J. Heinz Co. contract out significant parts of their IS infrastructure, everyone takes notice. The benefits of outsourcing are apparent: lower fixed costs, easier management and the leverage to play competing vendors against one another. More IS executives are also coming around to the view that saving money for their firm is better for their careers than building a big department. Warner-Lambert IS chief Tom Hippe boasts that his firm is making its IS staff more competitive by encouraging users to solicit project bids from external and internal sources.

But the outsourcing decision is not a no-brainer, and its full implications haven't yet been felt. Several large companies have made major outsourcing commitments in the last two years, but some of those firms have been in deep financial trouble, and cost considerations have played a huge part in their decision.

Users who have taken the plunge also say that cost is among the *least* important issues to consider. The tough nuts are deciding which parts of your operation can be farmed out; who's responsible for integrity, security and liability; and how much control the user firm should expect to maintain.

There are also significant business factors working against outsourcing at this point. We now accept as gospel that businesses must decentralize and distribute to keep pace with rapidly changing markets in the 1990s. We take for granted that more control over information is moving to the user's desktop. Finally, the evidence indicates that data is becoming a corporate strategic asset rivaling in importance the actual goods the company produces. How prepared are you to hand that kind of treasure over to someone else for safekeeping?

It's easy to think of the computer room as a utility not unlike the air conditioning or the telephone. We suggest it should be treated more like the factory floor — a life-sustaining function that must constantly be improved to maintain competitive position. The future of outsourcing will hold its share of horror stories as well as successes. While waiting for the dust to settle, don't be too hasty to hitch your wagon to this star.

LETTERS TO THE EDITOR

The code truth

Your article "For better and worse" [CW, May 7] reported that Ada programming projects showed productivity rates ranging from nine to 11 statements per day. In the same paragraph, you reported that Fortran projects experience a productivity of 14 statements per day.

Readers were not given a basis for comparing these figures. As we all know, a system coded in Ada might require more statements than the same system coded in Fortran. To make a comparison of coding costs, one must adjust for this size factor, as well as for differing productivity rates. As no comparative size factor was given, readers could easily have incorrectly concluded that a 100,000-statement Fortran system would have been a 100,000-statement system had it been coded in Ada.

Consider what it might have been were the two languages APL and assembly rather than Fortran and Ada!

Tom Day
Litton Computer Services
Mountain View, Calif.

More than SNA

We read with interest your story, "Codex links 9800 to Netview" [CW, April 2], about the new Codex 9800 Integrated Network Management System, which features an interface to IBM's Netview network management system. IBM's open network management strategy encourages companies to develop products that help our customers in this way.

We do wish to emphasize that IBM's Netview/PC product also provides solutions for customers who wish to connect non-Systems Network Architecture devices to Netview. Independent software developers have given Netview/PC strong support, as shown by the more than 40 products that currently interface to it, many running with OS/2.

Michael F. O'Brien
Director, Telecommunications Systems Marketing
U.S. Marketing & Services
IBM
White Plains, N.Y.

Inconclusive?

Your Product Spotlight on front-end computer-aided software engineering [CW, April 9] explored many critical issues to consider in purchasing a CASE product. However, as a consultant experienced in user research, and one who also provided input for the article, I am concerned with both the methods used in gathering the information and the analysis of the results.

Although the results of this survey were largely inconclusive, the headline and article depict Knowledgeware as the clear overall winner. In such a subjective study, differences of even 1.5 may not be conclusive. This is particularly true of a survey that provides 10 choices for each category, making differences between ratings of 6.0 or 7.0, for example, largely inconsequential.

Furthermore, the survey does not provide a clear picture of who responded to the questionnaire. At CASE Associates, we have defined six categories of information systems organizations, and through my experience with both CASE vendors and potential customers, I have found that IS organizational structures dictate product selection criteria. Therefore, it is difficult to draw gross conclusions from the survey without knowing who responded.

The survey also showed that the respondents, on average, are using CASE for only 47% of their new development work. Perhaps the survey should have identified which firms use CASE for 100% of their new development work. They clearly would be more knowledgeable and committed to CASE technology.

Dave Sharon
President
CASE Associates, Inc.
Oregon City, Ore.

Early birds

Your article, "NCR has pricey power in Micro Channel 486 box" [CW, May 28], noted that "NCR has recently jumped into the 80486-based computer market . . ."

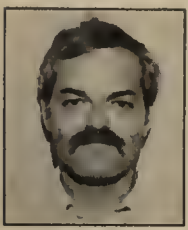
Actually, NCR entered the 486 market in November 1989, when we were the fist vendor to ship a 25-MHz 486 Micro Channel-based system. Two weeks ago, we were once again early to market with three 486-based products: a 33-MHz server and desktop, and a technology upgrade.

Gary Horning
Assistant Vice-President, Workstation Products Division
NCR
Dayton, Ohio

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax: (508) 875-8931; MCI Mail: COMPUTERWORLD.*

Missing links to unlikely merger

JEFF ANGUS



The evanescence of the near-complete merger of Lotus Development and Novell is one of those *Thirtysomething* false-start relationships. When the dominant networking operating system provider agreed to join the still-leading business software company, it looked great to them. But it looked like a kinky combo to the computer industry and financial analysts who couldn't understand how a merger could benefit either firm. This almost-merger is worth discussing, not to rehash what's been said, but what was missed.

Why the merger? This merger could have been the keystone of Lotus' goal of rehabilitating itself. Lotus' strength has rested on one product: 1-2-3. It has taken the revenue this cash cow has generated and invested it in other products, ranging from the visionary (Agenda) to the despicable (Manuscript). In Lotus' area of strength — large corporate customers — its cash cow is highly saturated, giving it smaller opportunities for growth than it would like. So how do you get into markets with lower total saturation and higher growth?

Through Novell, the dominant provider of accounting and networking solutions to small- and medium-size companies, a merger partner could have access to the most successful pool of value-added resellers (VAR) in the business.

Novell dealers have access to the smaller sites, are used to selling a technologically complex product and are used to the chronic support requirements that most networks require. Novell's VAR network would get Lotus into a market it never mastered, with a lot of room for growth. So, what was in it for Novell? That firm's ongoing tug-of-war with Microsoft for control of the microcomputer networking arena has given Novell a healthy appreciation for the power of technological advantage in that part of the market.

What Novell saw Lotus bringing to the partnership was a visionary approach to microcomputer applications. In short, Lotus was a good conduit to a sharp marketing vision of the future — the blending of Lotus' application savvy with Novell's system savvy.

So the merger made some good sense but probably not enough to justify it. Why?

Mergers don't usually make sense. Mergers don't usually make business more productive. As organizations grow bigger and more diverse, it becomes harder to maintain the special light they followed as smaller concerns. It becomes harder to render creative ideas and change directions.

Donald Clifford and Richard Cavanaugh, in their book *The Winning Performance,* discuss factors that help companies thrive in changing environments. One of the key factors is the sense that the enterprise is special in what it stands for, what it does, and how it does it.

Mike Constable

That unity of purpose becomes diffuse as companies combine and try to resolve their cultural and personality differences. Compromise does not work well in culture. It's confusing to the employees, managers and analysts, and more importantly, to the customers.

Mergers also make companies bigger, and that destroys innovation and competitiveness. Every decade, the U.S. Department of Commerce does a study on the most important inventions in the last 10 years. The results are always the same: Small business is responsible for three-quarters of the significant innovations. Big companies don't produce innovation because that is not what they're good at.

If you like free enterprise, you've got to hate mergers on principle. If you work in the information industry, you've got to hate mergers because they stand in the way of progress while raising the prices you pay for goods and services.

A failure of nerve. The Lotus/Novell merger failed, not because of the long-term profitability of the arrangement, but for the reason most U.S. businesses are struggling in the world economy — pinheaded ego battles and short-term gains. The two principals, Lotus' Jim Manzi and Novell's Ray Noorda, are a pair of giant egos who, I suspect, have invested massive amounts of their self-image in the companies they run.

Certainly, for the reasons discussed above, it was in Manzi's interest to make this happen for Lotus' shareholders. In the end, he stopped compromising with Novell when his own authority would have been diminished in the deal. Noorda apparently made initial pricing decisions on the transaction without consulting other large shareholders. Did he figure they'd follow him no matter what he did, or did he just not care? Either way, it was an act of pure ego, unfettered by concern for the firm or its shareholders.

When Noorda went back to the table to regain points he'd already given away, he violated a cardinal rule of negotiation, terminating the opportunity. If executives can't get their neurotic ego problems out of business, our economy suffers.

Who wins, who loses? The evaporation of this merger explains one of the interesting rules of capitalist societies. Mergers usually force customers to pay more for less innovative product, as larger companies can dominate a market and force its will. This works in industries, such as computers, where distribution systems force out small players.

However, while revenue goes up for the merged mutant, the economy as a whole suffers as the giant wastes resources and loses opportunities to nimbler, more creative, competitors overseas.

Angus is a manager at Farallon Computing, Inc., a manufacturer of Macintosh networking hardware and software in Berkeley, Calif.

Pay up, or bombs away

LEE GRUENFELD

Imagine that you contract with a builder for a new house. After it is completed and you move in, you discover that the plumbing leaks, tile is cracking and half the windows won't open.

You decide to withhold final payment until these deficiencies are corrected. The builder does not agree with this and informs you that he has built a stick of dynamite into one of the structural members which, when detonated, will reduce your dwelling to toothpicks. This will clearly have a profound effect not only on the house but on your ability to conduct your life normally.

Disregarding the obvious physical dissimilarities, this situation is not much different from a software contractor placing a bomb in your new system to be detonated upon your failure to submit a due payment.

There have been a number of such incidents lately, taking several forms. In one case, the vendor included code (the bomb) to prevent an application from operating if the system clock had exceeded a certain date. Only if the vendor was satisfied that the customer's payments were current would they update the code to check for a later date.

In another instance, a contract programmer "reclaimed" his disputed software by allowing a similar bomb to go off and render his customer's system useless.

Weak defense

While at first blush this technique might seem a legitimate vehicle for the developer to reclaim property not paid for, it has several problems.

First, in any dispute, there are two sides to the story. It is not necessarily the case that a payment or other obligation is due, it is only the case that the vendor *believes* it is due. The customer's denial of this may have equal legitimacy, depending on the facts of the case.

The problem here is that the vendor has set itself up as judge, jury and, most importantly, executioner, and has denied the customer of its right to protest, to present its arguments to a legitimate forum, to negotiate a settlement or to do any of the other things we all have a right to expect in this country.

Secondly, the potential harm to the customer caused by the sudden disappearance of its system may have repercussions far in excess of the amount in dispute. Imagine an airline or a ticketing service getting shut down over a $5,000 bill.

Finally, the bomb is a surprise that was not part of the original agreement. Thus, the customer had no opportunity to decline to enter into the contract in the first place, which it might have done if it knew the risk it faced. The customer's only recourse while a dispute is in process is to seek an injunction to prevent the bomb from being triggered.

Fortunately, there is precedent for this. In 1988, Frank & Sons, Inc., a trucking concern in Oklahoma, sought an injunction to prevent Information Solutions, Inc. from triggering a bomb when Frank & Sons withheld payment pending repair of some bugs. The court granted the injunction and rejected appeals by the software developer for the following reasons:

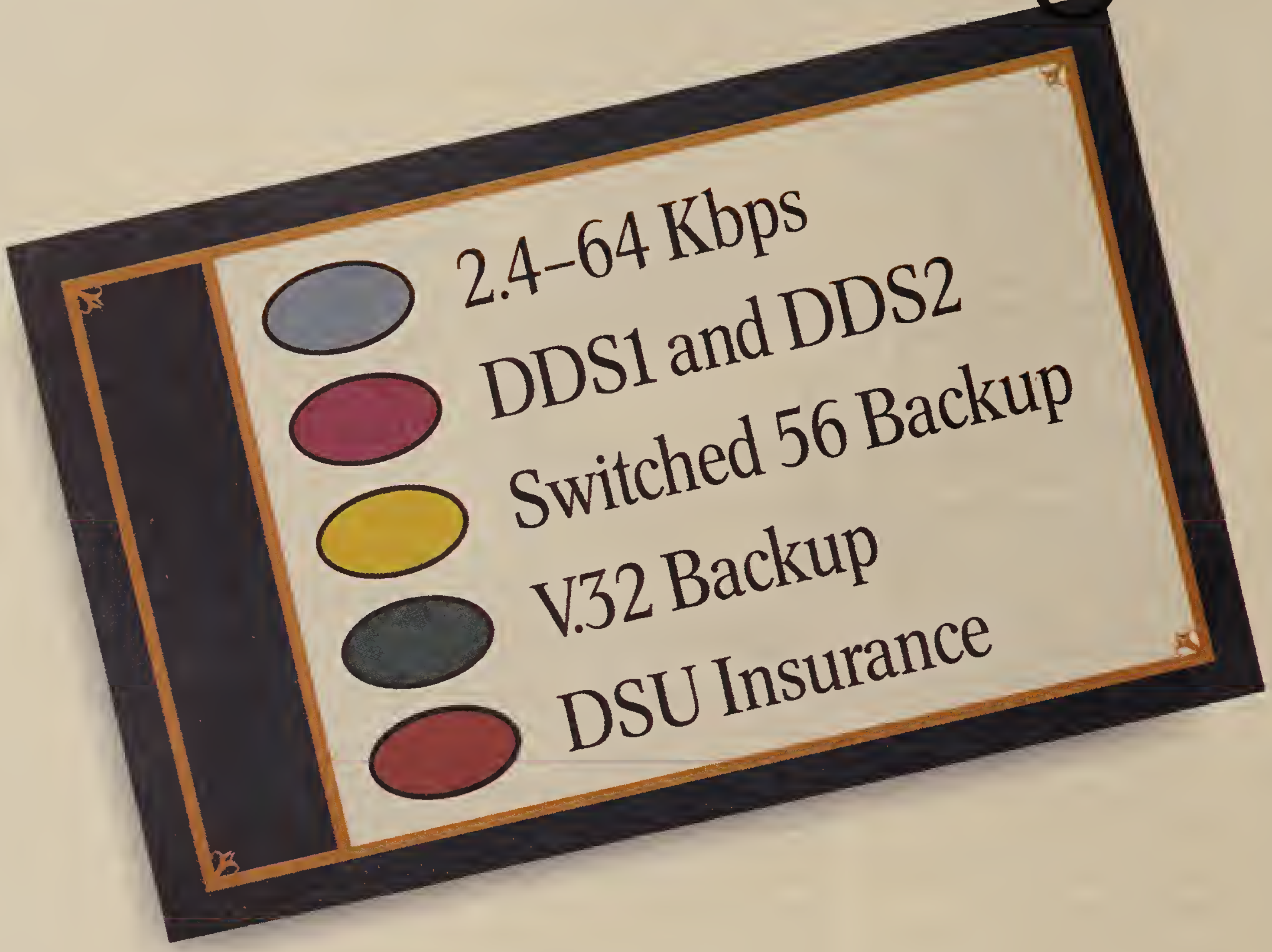
- The bomb was not disclosed to the customer before the contract was signed. The extraordinary nature of the device made this contrary to public policy.
- Frank & Sons was able to show that it would suffer irreparable harm if the bomb were triggered.
- The harm to the customer would be out of proportion to the harm to the developer. All the software firm would lose is some bargaining leverage (the injuction has nothing to do with its ability to pursue the claim). The trucking company would suffer substantial real damage, before there was any proof that it had even done anything wrong.
- Finally, there was a good likelihood that Frank & Sons would prevail in its contention that it did not yet owe the vendor the final payment.

What if a vendor actually ignites a bomb? According to Ron Johnston, co-editor-in-chief of "The Computer Lawyer" and a partner at Blanc, Gilburne, Williams & Johnston in Los Angeles: "The bomb could backfire and result not only in punitive damages against the vendor but criminal sanctions as well."

What if the customer is told about the bomb prior to entering into the deal? The threat of such a Sword of Damocles amounts to extortion, which strips the customer of any bargaining leverage and is therefore sufficient grounds to reject the contract and the entire deal, if necessary. Furthermore, it is not a bad idea to include a contract provision whereby the vendor states that no such device exists.

Gruenfeld, a management consulting partner in the Los Angeles office of Deloitte & Touche, specializes in computer-related legal matters, including contracting and litigation.

Introducing the LN DSU. Winner in all categories.



Fujitsu's new LN DSU is a sure winner. We've incorporated maximum features into this versatile, compact design to bring you the most advanced, high performance DSU ever to be networked.

The LN DSU's superior flexibility supports DDS (DDS1), DDS/SC (DDS2), 64 Kbps clear channel, and Accunet™ switched 56. Additionally, it offers restoral capabilities at either high speed (56 Kbps) or low speed (9.6 Kbps). And as the newest addition to our LN family of integrated networked products, the LN DSU can be controlled by the FMS 1000,™ our easy-to-use, affordable network management system.

Best of all, the LN DSU comes with the same guarantee we made famous with our modems. Should one fail during the first year, we'll give you another LN DSU free. And fix the first one, also for free.

That's Fujitsu DSU Insurance*—backed by one of the best nationwide service networks in the business.

So if you're looking for a sure thing in a DSU, look at Fujitsu's LN DSU—the guaranteed winner in all categories. Call Fujitsu Data Communications Division at 800-422-4878, in CA, 408-434-0460, and in Canada 416-673-8666.

---

*The limited offer for Fujitsu DSU Insurance is only open to new purchases of LN DSUs from an authorized Fujitsu America distributor and is subject to the terms of our DSU Insurance Policy.

Accunet is a trademark of AT&T. FMS 1000 is a trademark of Fujitsu America, Inc.

FUJITSU

SYSTEMS & SOFTWARE

HARD TALK

J.A. Savage

Place your bets

Like the opening bet in stud poker, Hitachi Data Systems' recent announcement of its top-end mainframe has only the first card showing.

The fact of the announcement, not necessarily its details, is the important news here. It opens the latest round of high-stakes marketing poker between HDS, Amdahl and IBM.

In this game, users hold house odds.

The actual delivery of HDS' mainframe is supposed to be a year away. Before then, IBM is supposed to announce a step toward its "Summit" computer, which some analysts have called the J Prime, or perhaps even the long-awaited Summit itself this fall. Amdahl is also on its way to an announcement, as soon as it can finish testing.

HDS opened the game with a decent bet — a four-processor system capable of 150 million instructions per second (MIPS), which everyone believes is set to go eight-way as soon as the company feels like it. It will have a few other nifty features, beating IBM with fiber-optic channels and offering support for

Continued on page 34

Massive speculation

Cray banking on parallel processing, but whose?

ANALYSIS

BY ELLIS BOOKER
CW STAFF

MINNEAPOLIS — Massively parallel computing, for years part of Cray Research, Inc.'s long-range research and development efforts, is now firmly part of the vision for the products Cray plans for the end of the decade. The question is: Will Cray build its own parallel processor, or will it acquire one?

Cray's current top-of-the-line computer, the Y-MP/8, uses eight processors; a 16-processor machine, with 10 times the performance of the existing line, is planned for delivery in 1992. A follow-on to the Y-MP/16, with a peak performance of more than 100G floating-point operations per second (FLOPS) and 64 or more processors, is in the planning stages for a 1995 target date, according to Cray sources. Cray has stated that it wants to have a one trillion-FLOPS machine by the end of the decade.

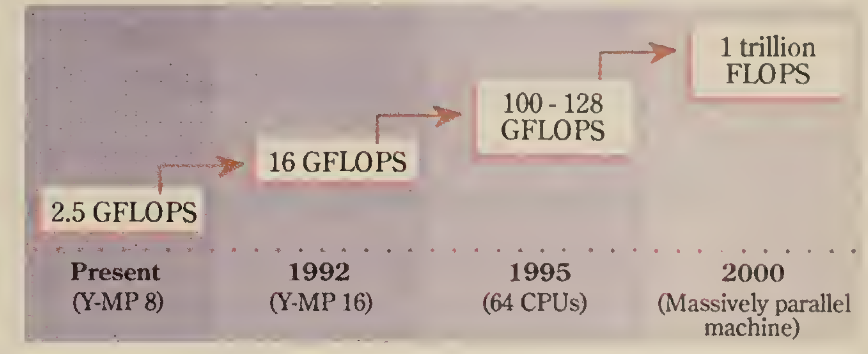
In parallel systems, hundreds — or even thousands — of relatively simple processors attack a computational problem. Software has been a stumbling block to the approach, however. Parallel systems require computer code that is "parallelized" — broken into pieces and parceled out to the individual processors. Other issues include how to optimize the work of each processor, how to manage communications between processors and how to handle data dependency in parallel environments, where the solution to one problem is dependent on the answer to a previously solved problem.

At Cray's annual meeting last month, for example, Cray officials stated the firm's intention to reach a one trillion-FLOPS machine by the end of the decade but acknowledged that reaching that goal will require a new computing architecture.

"Our view is that [massively parallel] systems are a form of special processors, and we're looking at a strategy to tightly couple these to a general-purpose processor," said Lester T. Davis, executive vice-president at Cray's Chippewa Falls, Wis., center for engineering and development, during an interview with *Computerworld.*

Parallel tracks

Cray Research acknowledges that the growth path from its current Y-MP family requires massively parallel technology



Source: Cray Research, Inc.

CW Chart: Doreen Dahle

Davis added that it would be "a long struggle" for massively parallel systems to replace general-purpose machines. He also said Cray had spent the past year examining the massively parallel approaches of other vendors.

While Cray executives continue to argue that existing massively parallel systems are best

Continued on page 36

Software AG touts option to AD/Cycle

BY ROSEMARY HAMILTON
CW STAFF

Software AG of North America, Inc. is launching an IBM AD/Cycle alternative this month with the general release of Predict CASE, an integrated set of software tools with a repository-based engine.

"Our message is, yes, AD/Cycle is the correct approach, but [with Predict CASE] you don't have to wait," said Peter Page, an executive vice-president at Software AG.

AD/Cycle is IBM's application development architecture that will rely on many third-party tools and a host-based repository, which runs on DB2. The repository will hold information about the application development process.

IBM has also stated that AD/Cycle, introduced in late 1989, will take years to implement, and the integration between the repository and development tools will not exist until next year. The initial version of Repository Manager is scheduled for release this month.

Ready for work

Software AG, on the other hand, claimed to have a more complete product that users could put to work today. The software will work with either Software AG's relational database management system, Adabas, or IBM's DB2. The company plans to make it compatible with IBM's AD/Cycle as those product specifications become more clear, according to Page.

Predict CASE relies on existing Software AG tools such as Natural, a fourth-generation language environment. The database engine is built into the Predict CASE package, which is a key difference from the IBM offering. With AD/Cycle, users are required to buy Repository Manager and DB2.

Page said the repository component, which he called a development database, provides the entity-relationship guidelines for application development. Currently, the company is developing business models, which will reside in the repository. These models can be customized at client sites but will contain up to 80% of the information a customer would need, Page said.

the totally automated office
The Next Generation in Office Automation

● *Fully Customizable* ● *Decentralized Administration* ● *Full Connectivity* ● *Integrated PC Support* ● *Resource-efficient*

Emc^2/TAO IS A QUANTUM LEAP FORWARD IN ELECTRONIC MAIL AND OFFICE AUTOMATION.

Emc^2/TAO is a dynamic system that gives Electronic Mail and Office Automation to everyone — from novice to expert. It can be tuned on an individual basis to suit the user's abilities and needs. Novices can start on day one with no training. Experts have everything they need. And, it has been designed as a platform to support an emerging set of capabilities as the evolution of office automation continues.

POWER THROUGH SIMPLICITY

Emc^2/TAO provides hundreds of easy-to-use features for managing, organizing and distributing Electronic Mail and documents. Emc^2/TAO includes electronic-mail, calendaring, document storage and retrieval, and a multitude of powerful bridges and gateways.

Emc^2/TAO gives full control through decentralized administration. Authorization can be delegated by **feature**, by **department** or by **logical class.** And Emc^2/TAO's user interface allows product features to be custom-tailored to suit the needs of each individual user or group of users, at the installation's discretion.

Emc^2/TAO is simple, powerful, and allows unprecedented connectivity.

ALL ENVIRONMENTS

- MVS, MVS/XA
- VM/CMS
- VSE, SSX
- TSO, CICS, IMS, IDMS
- PCs (Personal Emc^2)
- VAP (Special Emc^2 VTAM Application)
- FIVS (Fischer International Virtual System)

GATEWAYS

- PCs and LANs.
- SNADS.
- X.400.
- BITNET.
- DIA/LU 6.2 compatible devices and systems.
- Western Union services: (Telex, Facsimile, EasyLink, etc.)
- DISOSS.
- PROFS.
- DEC (VAX Mail, All-in-One).
- WANG (Wang Office).

And more.

CALL NOW for more information. Toll-free: 800 237-4510. In Florida: 813-643-1500.

FISCHER
INTERNATIONAL
SYSTEMS CORPORATION

Emc^2
TAO™
ELECTRONIC MAIL COMMUNICATION CENTER / TOTALLY AUTOMATED OFFICE

Emc^2/TAO is the smart answer.
Many of the largest corporations in the world have already selected Emc^2.

You're looking at your largest technology investment. What a shame you've had to expend most of it working around the limitations of conventional databases.

Fortunately, Ingres has changed all that by introducing the first intelligent database.

We call it intelligent because it helps organizations operate more intelligently. In short, it gives you the ability to manage not just data, but knowledge and objects as well.

The unique Ingres Knowledge Management™ facility lets you manage business policies or

1080 Marina Village Pkwy., Alameda CA 94501 (Corp. Headquarters) • 1801 Rockville Pike, Suite 200, Rockville MD 20852 • 5650 Yonge St., Suite 1700, North York, Ontario M2M 4G3. Ingres, Intelligent Database, K

Finally. A database

to free-up all this v

rules—and referential integrities—inside the database server. Because this information is centrally enforced and managed, you get complete control of your data and its integrity. And your programmers don't have to write rules and referential integrities in each application.

dge Management and Object Management are trademarks of Ingres Corporation. © 1990 Ingres Corporation.

An unlimited number of rules can be stored in the server. And features like unlimited forward chaining and recursion mean that rules fire when expected.

Ingres Object Management™ gives you the ability to manage types of data that are difficult or impossible for conventional databases. User-defined datatypes—like geographic coordinates or manufacturing tolerances—are stored and used within the database server. They can even be manipulated using standard SQL.

Rather than wasting time converting data to fit the constraints of your database, you can teach your database to understand data the way your organization uses it. So your data becomes more relevant to how you do business, and your database more useful than ever.

And as if this weren't enough, the Intelligent Database™ also features improved data management capabilities, giving you enhanced performance for OLTP, decision support and distributed processing.

The net result: the Ingres Intelligent Database lets you model the real world—your business—like no other database in existence.

So remember. When you want to get the most out of your most valuable hardware, you have only one intelligent choice.

Call 1-800-4-INGRES to find out more.

Ingres

Intelligent database. Intelligent decision.

intelligent enough
luable hardware.

INTRODUCING LEVEL5 OBJECT™

THE POWERFUL OBJECT-ORIENTED EXPERT SYSTEM IN WINDOWS.

With LEVEL5 OBJECT, you get something new in expert systems.

Power. And ease of use.

The power of an object-oriented database manager driven by forward and backward chaining inference engines. The power of demons, pattern matching, and database interfaces. The power of rules, hypertext, agendas, and triggers.

In short, the power to develop sophisticated applications quickly.

And easily. LEVEL5 OBJECT lets you take full advantage of the familiar point-and-pick technology of Microsoft Windows®. You create applications using a graphical knowledge tree, and our unique set of predefined objects automatically builds the bulk of your knowledge base. As you build and edit your application, LEVEL5 OBJECT automatically compiles into binary code.

As with all Information Builders products, LEVEL5 OBJECT is backed with expert technical support, training, and education.

To see how LEVEL5 OBJECT can help you develop knowledge-based PC applications faster and easier, call 1-800-444-4303.

LEVEL5™

INFORMATION BUILDERS, INC.
DEVELOPERS OF FOCUS, THE LEADING 4GL

800-444-4303

Microsoft Windows is a registered trademark of Microsoft Corporation.

DEC cites printer cost, functionality

Digital Equipment Corp. recently introduced the Declaser 2000 line of desktop laser printers as a lower-cost, higher-function replacement for the LN03 line of printers.

Slated to be available next month, the Declaser 2100 printers are priced from $2,399 and the Declaser 2200s from $3,599 when bought in quantity or with a Decstation personal computer, workstation or VAX system. DEC is billing the new printers as inexpensive enough for personal use but sturdy enough for a shared office environment.

DEC IS billing the new printers as inexpensive enough for personal use.

The Declaser 2000 line includes the simplex Declaser 2100 for one-sided printing and the simplex/duplex Declaser 2200 for printing both sides. Each produces up to eight page/min. with a resolution of 300 by 300 dot/in., and each supports multiple paper sizes.

To enhance their use with PCs, DEC will offer an optional protocol cartridge that enables either model to emulate the Canon, Inc. brand of laser printers, which is supported by a large number of PC software applications. Additional software enables users to emulate the Hewlett-Packard Co. Laserjet series of printers as well.

MARYFRAN JOHNSON

Security Pacific's new strategy

The relational database is becoming its cornerstone for global trading

ON SITE

BY JEAN S. BOZMAN
CW STAFF

LOS ANGELES — Security Pacific Corp. is making relational database technology the centerpiece of its global trading activities.

The bank, the fifth-largest bank holding company in the U.S. with $84 billion in assets, is loading relational databases in its major trading centers — New York, Los Angeles, Tokyo, London, Sydney and Frankfurt — with transaction data and presenting "slices" of that data on hundreds of MS-DOS-based workstations.

That is all part of an emerging client/server strategy, said Richard J. Harmel, first vice-president of facilities and technology at Security Pacific's Merchant Bank operation.

There is a drive to standardize on a relational database — in this case, Digital Equipment Corp.'s RDB on a DEC VAX. Moving toward standards is a way to homogenize what Harmel said was once "an agglomeration of VAX and IBM VM/CMS applications stuck together with bubble gum and baling wire."

About 14 months ago, Harmel and his staff of 12 software developers embarked on a migration toward a more standard environment — one that will eventually migrate all trading data to the RDB databases. Hundreds of users access these databases daily, collectively trading about $20 billion per day in 40 currencies. In February, the first phase of this RDB-centered environment went into production. A second phase of the project is expected to add an RDB-based real-time trading environment by next month.

If achieved, a centralized repository of data would give Security Pacific's trading systems an edge against competitive banks, Harmel said. "Ultimately, I would see many applications going against the same database, as the real-time components of our trading environment come together," he said. "We're [actively] discussing now how soon such a thing could be done."

The advantage of using relational technology, Harmel said, is that it allows transaction data to be accessed for pattern analysis and ad hoc queries. For now, older database systems that use hierarchical, indexed or flat-file database structures hold much of the trading information.

Until there is a single system, the bank will have to display information from separate databases on multiwindowed workstations. "A lot of processing is taking place at the workstation," Harmel said. "A relational database environment gives us the foundation to begin with, but we'll still need filters [at the workstation] to turn all that data into useful information."

One source of nonrelational data is a real-time transaction monitoring system that takes a global "snapshot" of all the bank's trading positions. Multiple IBM System/36 machines are used in overseas sites, while Security Pacific Automation Corp.'s IBM mainframes handle most of Security Pacific's back-office order processing.

However, there are links between these dissimilar systems, systems developer Carol Swart explained. One system can dial up many others, allowing Tokyo traders to access Los Angeles files, for example. The Money Market II VAX-based system, which uses a proprietary database to store data about U.S. Treasury bill issues, updates RDB nightly, Swart said.

As trading proceeds, RDB updates can be posted through the Trading Room Inquiry and Capture System, a VAX subsystem. This VAX "process" under VMS taps into the Money Market II data, then combines it with RDB data.

Alan Levenson

Security Pacific's *Harmel is taking firm to a standard RDBMS*

The round-the-clock nature of global trading is crowding out the traditional overnight scheduling for batch updates. "We're expending a lot of energy keeping the databases in sync," Harmel said. "For us, the day begins in Sydney, Australia, and ends in Los Angeles [at 3 p.m.]."

Harmel's computing resource — several dozen VAX machines scattered around the world — is operated and maintained by the bank's information systems umbrella, Security Pacific Automation. The cost of running the computers, however, is absorbed by business units such as global trading. "Security Pacific is doing everything in its power to make itself run more efficiently," Harmel said.

Security Pacific's drive toward standards has gone much further on the desktop than with the bank's database servers. The new "client" workstation, Rapid Access Display and Information Utility System — known as RADIUS — is being offered to traders as one way to sort through the daily onrush of numerical data.

RADIUS is based on industry standards, such as MS-DOS and Intel Corp. 80386 processors, to give traders freedom of choice in purchasing spreadsheets and to save on application development costs. "The traders and the dealers [in our operation] are computer-literate, so they know what analytic programs they want to use in their work," Harmel said. "I'm providing them with a spreadsheet environment and maintaining the overall information resource."

SYSM

The E-Mail System That Delivers . . .

Productivity to Your Office
SYSM is ready to work for you. This easy-to-use electronic mail system contains a workgroup of essential tools for CICS sites. Private and shared user lists, files, bulletins, calendars and schedules all combine to help employees manage timely, effective communications.

=

Rebates To Your Annual Budget
SYSM e-mail saves on phone charges, file room expenses, and delivery fees while increasing employee productivity. Apply those recovered communication dollars to your non-reducible expenses and watch your budget stretch.

The World to Your Fingertips.
Interfaces to Soft·Switch, FAX, PROFS®, Western Union's EasyLink℠, DISOSS, BITNET, TTY devices, PCs and LANs bring worldwide connectivity to your IBM computer terminal.

CALL 800-338-6692 for a FREE Teledemo and let SYSM deliver.

H&W
® H&W COMPUTER SYSTEMS, INC.
P.O. Box 15190
Boise, Idaho 83715-0190
(208) 385-0336

SYSM® is a registered trademark of H&W Computer Systems, Inc.
PROFS® is a registered trademark of IBM. EasyLink℠ is a service mark of Western Union.

WHY DID WE
A 12.5 MIPS W
FOR

BECAUSE

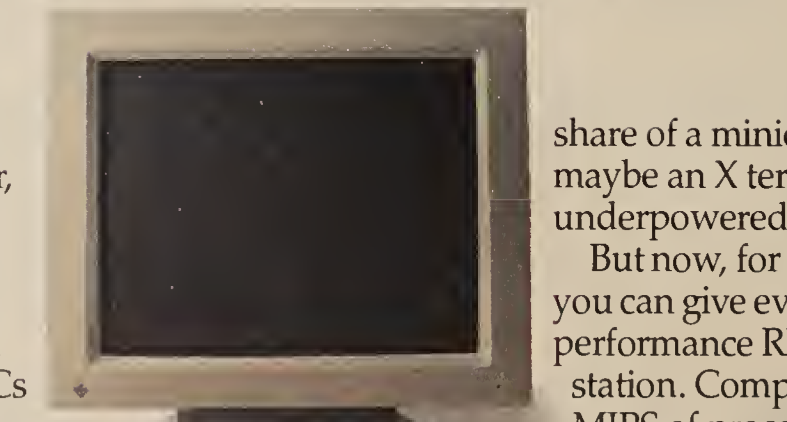
SPARCstation™ SLC. By breaking the $5,000 barrier, it turns the economics of computing absolutely upside down. And lets you give your people a system that runs circles around PCs and minicomputers.

Up till now, for this price you'd have to settle for a 386 with one or two little extras. Or a share of a minicomputer. Or maybe an X terminal with an underpowered processor.

But now, for the same price, you can give everyone a high-performance RISC workstation. Complete with 12.5 MIPS of processing power. The UNIX® operating system. 8 MB of memory. Even built-in Ethernet.®

But more than a hot machine, you can give them all the strategic advantages that come with our SPARC™ technology.

First, our workstations were meant to b networked. So you can have whole groups working on the same project. In perfect synch. And every user has serious processing power. Right at the desktop level. Second, there's the OPEN LOOK™ user interface. Which lets people learn to use UNIX in no time flat. Finally, there's UNIX itself. With UNIX, your people can create



© 1990 Sun Microsystems, Inc. *Sun Microsystems and the Sun logo are registered trademarks of Sun Microsystems, Inc. SPARCstation, SPARC, and SPARCware are trademarks of Sun Microsystems, Inc. OPEN LOOK is a trademark of AT&T. UNIX is a registered tradema

INTRODUCE ORKSTATION 4,995?

WE CAN.

applications that would take a lifetime to develop any other way. In fact, there are over 2,000 SPARCware™ applications that are ready to run right now. So you have the added advantage of choosing the world's largest standard for RISC/UNIX software compatibility.

How did we design all this into a $5,000 system? Since 1982, we've built nothing but UNIX workstations. So we've learned a few things. We completely eliminated the processor box. By building the electronics into the back of the monitor. We gave it a high-resolution monochrome display. And since SPARCstation SLC is designed for workgroups, all the files can be stored in a central server. Or on a local disk, if you'd rather.

For a lot of companies, introducing a machine like this would be next to impossible. But at Sun, it's not exactly our first breakthrough. And this is no announce-it-today, ship-it-next-year product, either. SPARCstation SLC is available in quantity today.

SPARCstation SLC. If you'd like to see how it compares to every other system you could buy, just call 1-800-624-8999 ext. 2066. From anywhere in the U.S. and Canada. And get ready to move your people a quantum leap ahead.

Because now you can.

sun
microsystems

of AT&T. Ethernet is a registered trademark of Xerox Corporation. *U.S. List Price Quantity 1, $4,995. Includes a 17-inch, high-resolution monochrome display, 8 MB of main memory, integral Ethernet, SCSI, and serial interfaces, and the Sun Operating System.

SOFT NOTES

IBM to market social service systems

IBM and **Transfirst Corp.** signed a deal to jointly market systems for social services such as Aid to Families with Dependent Children and food stamp and unemployment insurance programs.

The two will sell the Transfirst Accept electronic benefits transfer system to both government and health-care agencies. It provides automated benefit processing that eliminates some of the costs of manually processing and mailing forms and checks. The marketing effort is scheduled to run for four years.

IBM Canada Ltd. and **Aion Corp.** teamed up to sell Aion expert system tools in Canada. IBM will solicit orders while Aion continues direct sales efforts. The Aion products run on mainframes and IBM Personal Computers.

Ross Systems, Inc., Comshare, Inc. and **Price Waterhouse** recently formed a trio to sell Ross Systems' product with executive reporting capabilities. Ross will provide the application software and Comshare will contribute its Commander executive information system.

Once Commander is integrated with the Ross applications, Price Waterhouse will provide implementation and consulting services. Ross sells financial management, human resources and distribution software for the Digital Equipment Corp. VAX line of computers.

Boeing Co. recently licensed **DMR Group, Inc.'s** Productivity Plus, a system development methodology that will be used to create and maintain systems by Boeing's Application Systems Technology group. Productivity Plus includes guidelines, software and training.

After Trying Our Business Software, American Tourister® Sent The Others Packing.

It was an open and shut case. Only our *Financial, Human Resources* and *Environmental Management* software for the IBM AS/400 provides you with the mainframe functionality and PC ease-of-use necessary to let you get more work done.
That's why our midrange solutions are being chosen by more and more Fortune 1000 corporations.
Free White Paper Offer: For more information and a free copy of a white paper entitled, "Transparent Technology: Getting *Your* Work Done In The 90s," call 1-800-525-0490.
In Massachusetts, please call 1-508-778-2000.

Software 2000
The Difference Is Expertise.

ATLANTA • BOSTON • CHICAGO • LOS ANGELES • LIMERICK • LONDON

1800 Series Concept Collection from American Tourister   IBM and AS/400 are registered trademarks of International Business Machines Corporation.

HP ties minis to IBM nets

BY JEAN S. BOZMAN
CW STAFF

CUPERTINO, Calif. — Hewlett-Packard Co. recently sought to make it easier for its HP 3000 minicomputer users to tie into IBM networks and for new users to get into the HP 3000 line with a plug-and-play system.

HP announced a new release of its proprietary MPE/XL operating system that will give HP 3000 computers greater connectivity with IBM's Systems Network Architecture (SNA).

HP MPE/XL Version 2.1 allows customers to build one backbone network to accommodate X.25 and SNA communications. Among Version 2.1's improvements is the ability for HP systems to trigger network alerts for IBM's Netview.

"We replaced the bottom three layers of our OSI [protocol] stack with SNA transport layers," explained Olivier Helleboid, a product marketing manager at HP's Information Networks Division. "Customers now have the option of running HP-to-HP communications over their X.25 network, or HP-to-IBM communications, or both."

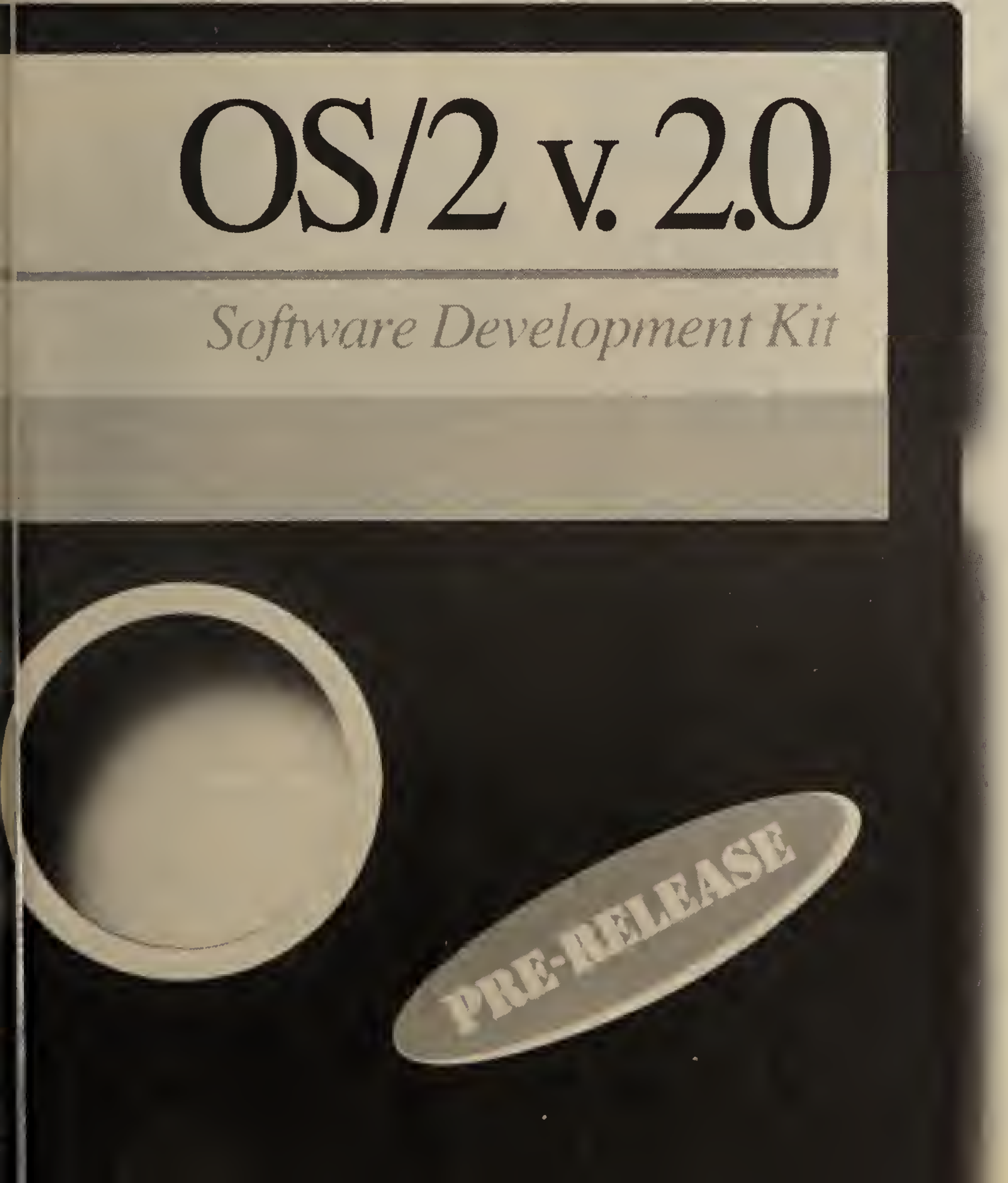
The new low-end system, the HP 3000 Series 920, is intended to speed installation of the system at office sites. "The operating system is preloaded at the factory, and all the peripherals are already installed," HP 920 product manager Sridhar Ramanathan said. "We have an HP technician check the power sources and plug the system into a wall socket." The system is available now for shipment.

The HP 920 unit supports 20 users but can be upgraded four times to become an HP 3000 Model 932, which supports more than 64 users. A $28,000 system includes main memory of 24M bytes, a 670M-byte hard disk drive, a 1.3G-byte Sony Ltd. digital audio tape backup unit, and HP's Allbase/SQL relational database management system.

In the stock market, insider information is a crime. In the OS/2 market, it's a blessing.

Now you can invest in futures and get the edge on your competition, all at the same time.

With the OS/2 version 2.0 Software Development Kit program.



It has everything you need to jumpstart your new 32-bit applications. And take full advantage of Intel's 386™ and *i* 486™ processors.

Not to mention OS/2's graphical interface, multi-tasking and advanced memory management.

You get successive pre-releases and final versions of 32-bit OS/2, Microsoft® C and MacroAssembler.

You also get Microsoft's improved CodeView® debugger.

Access to your OS/2 network while you're developing code.

And of course, expert on-line technical support.

Call (800) 227-4679, Dept. L79, to find out more. And do it now.

The early bird gets the application.

Microsoft®
Making it all make sense™

Customers within the 50 United States, call (800) 227-4679, Dept. L79. Customers in Canada, call (416) 673-7638. Outside the U.S. and Canada, call (206) 882-8661. © 1990 Microsoft Corporation. All rights reserved. Microsoft, CodeView and the Microsoft logo are registered trademarks and Making it all make sense is a trademark of Microsoft Corporation. Intel is a registered trademark and 386 and i 486 are trademarks of Intel Corporation.

Savage

CONTINUED FROM PAGE 25

24,000 peripherals.

While Amdahl flat-out denies it and IBM simply won't comment, both companies are expected to accelerate the time frame for their announcements, like card players nervously reshuffling their hands, because of HDS' play. They may also feel pressure to hedge their bets by adding (or letting out) more features and better pricing.

Check this out: The new HDS systems, not cheap at $14.4 million for the top performer, still beat IBM's list price on machines with less growth potential and fewer features by more than 20% in price per MIPS. According to Gartner Group, Inc. in Stamford, Conn., an IBM 3090 J costs $116,000 per MIPS, while the new HDS EX 410 will be $96,000 per MIPS.

That is one reason users hold house odds in the marketing game. While Amdahl and HDS always try to start list prices well below IBM, list is just a starting point, and it can only decline from there. HDS has set theirs reasonably.

Also, IBM and Amdahl may be forced to ante up more features. For instance, although current HDS users would have to swap boxes, the investment in memory and channels can be retained instead of going through a new purchase. In the past, Amdahl has reluctantly offered a trade-in option for upgrades. With this on the table, IBM may be forced to make the same concession.

Mark Hess at Gartner Group claims HDS is holding back, that there are several features within the computer that HDS hasn't "turned on" yet.

If the marketing betting gets hot and heavy, IBM and Amdahl may one-up HDS with features, and HDS could retaliate by unleashing a few more of its own while still making the promised shipment date. Users would benefit by having more features up front, instead of having them doled out when the companies need a kicker for their boxes.

The companies might even use the marketing game to bring their machines out more quickly than they would otherwise, although this scenario is less likely for everyone except HDS.

HDS' parent company, Hitachi Ltd., said it would deliver the same box to the domestic Japanese market with a proprietary operating system this fall. HDS should be able to roll out its machine soon after, since the only technology it adds is IBM compatibility.

Amdahl is probably rushing its machine as fast as it can. IBM has been burned before when it shipped processors and disk drives before they were proven. With the J Prime expected, users might be mollified until the Summit is ready.

While HDS' announcement may cause the usually ho-hum mainframe makers to do a little song and dance for the benefit of potential customers, HDS itself may get limited market share advantage — at least for the first year.

Its current high-end users number between 45 and 50 worldwide, according to the company. That means there are few users ripe for the new machines, and there will be a constraint on supply from Hitachi.

Jim Cassell, also with Gartner Group, estimates sales between 10 and 15 in 1991. At the same time, IBM ships in the thousands.

HDS is a patient company. It was almost humble on announcement day, eschewing dry ice and laser shows for food and decoration. It is going for the long haul and is expecting to grow incrementally, not take the market by storm.

In that respect, patience may be aided by HDS' relationship with its parent. Hitachi puts out almost all the money for research and development. Hitachi takes the risk, and all HDS does is buy the box from them and add compatibility.

Amdahl, which has been griping for over a year about not being able to make much money on its high-end machines, puts more money into hardware design and takes the risk on development.

Savage is a *Computerworld* West Coast senior correspondent.

Storage Tek's family expands

Storage Technology Corp. recently fine-tuned its tape library system with a new release of its host software as well as a new software package that adds automated functions to the tape management process.

The 4400 Automated Cartridge System is a tape storage and retrieval system that relies on robotics and software to manage a tape library.

The latest release of the Host Software Component will provide an interface from the operating system to the 4400, the company said. It will also support the company's Improved Cartridge Recording Capability.

The Expert Library Manager software package provides improved automation for such tape handling functions as scratch, slot and removal.

The host software is slated to be available later this month with an initial license fee of $13,500. Expert Library Manager is scheduled to be released in August with an initial license fee of $6,000, the company said.

ROSEMARY HAMILTON

It takes 120,000 pounds of thrust to get it aloft, and only 5 pounds of paper to ground it.

The ever-reliable Federal Express grounded? By a mere five-pound manual?

It will never happen. Thanks in part to a document processing system developed jointly by Federal Express and Xerox.

You see, Federal Express' vast fleet of planes has to be checked before every flight—following strict FAA regulations. A process that requires thousands of complicated manuals. And every time there's the smallest change in regulations, Federal Express has to update every one of those manuals.

To help get this kind of information to Federal Express' 70,000 employees faster, Xerox put together an innovative network of scanners, workstations and laser printers. Now the vital manuals are printed over 70% faster. And 96.2% cheaper.

What's more, planes aren't the only thing Xerox helps Federal Express move. With this system, graphics, text and data flow between multiple authors, and between Federal Express' existing PC's, Wangs and DEC's—with unbelievable flexibility.

So if you have a document processing problem you'd like Xerox to help you solve, call 1-800-TEAM-XRX, Ext. 122A. Or send in the coupon.

And let Xerox help you make sure that problems like this never keep your business from taking off.

Yes, I'd like to learn more about Xerox and how they can help solve my document processing problems.
☐ Please send me information.
☐ Please have a sales representative contact me.

Send this coupon to:
Xerox Corporation, P.O. Box 24,
Rochester, NY 14692

Malcolm Baldrige National Quality Award 1989 Winner

NAME Please Print TITLE
COMPANY PHONE
ADDRESS
CITY STATE ZIP 0013-6/18-90

XEROX
The Document Company

© 1990 XEROX CORPORATION. XEROX® is a trademark of XEROX CORPORATION

Computer networking that's simpler than ever.

OS/2 can do!

Seamless connectivity. Every business wants it. And every business will experience the limitations of trying to achieve it with DOS. But OS/2® Extended Edition (EE) was designed for connectivity and provides the flexibility you need today and tomorrow.

Now, you may only want to share a laser printer on a LAN configured with Token-Ring or PC Network. With OS/2 and OS/2 LAN Server, it's simple. Later, when you need to do more, like access a host or an Ethernet® network, you can, since OS/2 EE has these functions built in. And by adding IBM TCP/IP software, you can even access multivendor networks from your computer.

But best of all, when you combine OS/2 EE with IBM's Micro Channel™ and its interrupt-handling capability, you can run several communications sessions at once—without sacrificing reliability, even during peakload conditions.

Want to simplify your computer networking? With OS/2 Extended Edition, the solution is IBM.

Find out more about OS/2. Contact your IBM Authorized Dealer or marketing representative. For a dealer near you, call 1 800 IBM-2468, ext. 197.

IBM®

See OS/2 in action at PC Expo, June 19-21.

IBM and OS/2 are registered trademarks and Micro Channel is a trademark of International Business Machines Corporation. Ethernet is a registered trademark of XEROX Corp. © 1990 IBM Corp.

Cray

FROM PAGE 25

for "niche" applications, they have recently suggested that the addition of such a system as a subsystem to Cray's own machines might be feasible.

"They could get in by acquiring a [parallel processing] company. . . . I imagine there are quite a few who would welcome such a move," said Omri Serlin, editor of the "Serlin Report on Parallel Processing," a monthly newsletter based in Los Altos, Calif.

Possibly foreshadowing an acquisition strategy was Cray's entry into the minisupercomputer market earlier this year. In March, it signed an agreement in principle to acquire Supertek Computers, Inc., the maker of a computer system compatible with Cray's now-discontinued X-MP product line. Cray has said it will port its Unix operating system, Unicos, to the Supertek SL-1 and that a Y-MP-compatible machine is in the wings for the second half of 1991.

However, Patricia Laupheimer, vice-president of research at Shearson Lehman Hutton, Inc. in New York, said she does not believe Cray will need to go outside to get the hardware for a parallelizing system.

"I don't see why Cray can't do that as well as anybody else," she said, adding that she would not be surprised if the company turned to others to help it with the software side of the puzzle. "I would be surprised to see Cray fall behind in general-purpose supercomputing — which is to say that when the technology is ripe, Cray will be there," Laupheimer concluded.

"I personally don't believe you can get to [teraflop] levels without massive parallelism . . . over 100 processors," said David Micciche, vice-president of marketing at BBN Advanced Computers, a division of BBN Communications Corp. in Cambridge, Mass.

BBN Advanced Computers announced its current machine, the TC2000, in July 1985 and to date has installed a total of 13 machines worldwide — ten in the U.S., two in Japan and one in Europe. The company's largest sale to date was a $4.5 million, 126-processor system to Lawrence Livermore National Laboratory in Livermore, Calif.

In April, BBN underwent a 300-person staff cut across its operating units and repeated its statement from the beginning of the year that it was seeking "strategic alternatives" and additional investments.

Asked if BBN was talking with Cray about such strategic relationships, Micciche had no comment. A Cray spokesman confirmed that talks with BBN have occurred but said that they had been concluded.

However, achieving a 1-trillion FLOPS supercomputer — the Holy Grail of the high-performance computing industry — may be problematic, even with a massively parallel architecture.

According to a study presented by IBM last November, even massively parallel systems based on current technologies will have trouble reaching the 1-trillion FLOPS objective. The analysis predicted that it would take 2,566 NEC Technologies, Inc. SX/2 processors, 7,376 Cray Y-MPs or more than 24,000 IBM 3090 S-class mainframes to reach a 1-trillion FLOPS rating.

EXPANDING A DATA CENTER?

Because data center design becomes more complicated every day, only a specialist can handle the myriad problems and intricacies involved in their expansion.

And Datasphere is the specialist that excels! We have designed, expanded and built hundreds of thousands of square feet of data centers the world over. Our client list reads like a who's who of international commerce and industry.

For free literature and the rest of the story . . .

CALL DATASPHERE NOW!

800-221-0575

ECC returns to start for system rebuilding

ON SITE

BY MAURA J. HARRINGTON
CW STAFF

ATLANTA — It's not that often that information systems managers have the opportunity — or challenge — to rebuild their systems from the ground up.

When Joe Knesz was given the opportunity to decide how ECC America, Inc., a division of English China Clays International, would be replacing its IBM-based system, he jumped at the chance to make some changes.

"We're in a unique situation in that we're starting [over] from scratch. . . . I think the opportunity is positive," Knesz said.

Knesz and his superiors at ECC America had decided to get rid of the two IBM System/34s and one System/36 that had been used for 10 years and replace them all with a new Digital Equipment Corp.-based platform. However, just when Knesz thought everything was under control, ECC America acquired Georgia Kaolin, Inc., which runs its operations on three IBM System/36s, Knesz said.

In justifying the move to DEC, Knesz said, the bottom line was software. The IBM Application System/400 hardware that ECC America would have upgraded to "lacks the versatility of the DEC VAX environment that we felt was needed" for the software systems, Knesz added.

The VAX environment will include a VAX 6310 at each of the two production locations and a Microvax 3400 at a third production site, as well as another Microvax 3400 at ECC America's corporate headquarters in Atlanta.

The VAXs, which are located in Georgia, Alabama and Texas, will then be hooked together through a Decnet wide-area network. In addition, there will be a Novell, Inc. local-area network hooked up to each respective VAX via a gateway at each location, Knesz said.

The new system was scheduled for completion by the end of 1991, but the acquisition of Union, N.J.-based Georgia Kaolin, which came about after the system choice, pushed the date of completion back by at least a year.

Like ECC America, Georgia Kaolin is a mining company with operations in Georgia that process the mineral Kaolin — a fine, powdery substance that is used to manufacture a glossy material, which is in turn used to manufacture magazinelike paper, glossy paint, ceramics and more, according to Knesz.

"The merger will double our size from a revenue standpoint. From a systems standpoint, they are currently on three System/36s, and the strategy is to initially bring them into our new systems as quickly as we can," Knesz said.

Chosen challenge

While Knesz claimed that a DEC platform is his platform of choice for running the systems and applications software chosen, finding out about the Georgia Kaolin acquisition halfway through integration has made his job more challenging. However, Knesz said, he is still happy with his choice, and integration of the IBM systems will not interfere too much with his plans to finish getting the new DEC platform up and running.

"This [acquisition] obviously puts the pressure on us to move quickly," Knesz said, "but eventually, the conversion will be made by bringing their business software into our Ross Financials package, so we can convert their system onto the DEC platform."

Although he does not know when the two systems will be completely merged, Knesz said that he hopes to keep the Georgia Kaolin project separate from the VAX project as long as possible.

"We hope the software integration will be completed within a year. Eventually, we will convert their system to DEC, too," Knesz said.

"I guess this is an example of what makes life so interesting," he added.

NEW DEALS

UK mail to run Nonstop

The British post office recently chose the UK subsidiary of **Tandem Computers, Inc.** to supply its first systems for automating over-the-counter services for 21,500 post offices. The Thames Valley Project pilot will initially link 250 post offices, banks and motor vehicle license centers to a central Tandem quadprocessor Nonstop VLX system. The British post office averages 2,000 trans./day, from selling stamps to taking large cash deposits for the National Girobank.

Maspar Computer Corp. has announced the first European sale of its massively parallel computer system, the MP-1, to the University of Bergen in Norway. Introduced in the U.S. in January, the MP-1 will be used in the university's department of informatics, a parallel processing laboratory.

Ferguson Enterprises, Inc., the nation's largest supplier of plumbing, heating and industrial supplies, has purchased a $5.8 million fault-tolerant Sequoia Systems, Inc. Series 300 computer to automate its multilocation distribution business. The system, which Sequoia said will be the largest it has ever installed, will support more than 2,000 simultaneous users.

Israel Aircraft Industries (IAI) and **Digital Equipment Corp.** have announced a $25 million joint development venture to integrate IAI's computer-aided design, manufacturing and engineering functions over the next five years. IAI has agreed to buy hundreds of Decstation and Vaxstation machines plus software and services. The aircraft firm will also participate in DEC's aerospace integrated management system programs, along with General Dynamics Corp.'s Convair Division.

HARD BITS

Concurrent ports security

Concurrent Computer Corp. has signed an agreement with AT&T to port its System V/MLS multilevel security system to RTU, Concurrent's real-time Unix-based operating system. Tinton Falls, N.J.-based Concurrent said it expects to offer the combined multilevel security operating system by February 1991 for its 6000 and 8000 series computers.

Data General Corp. will be porting AT&T's LAN Manager/X software to its Unix-based Aviion line of workstations and servers. The licensing agreement with AT&T allows DG to offer LAN Manager/X customers a Unix-based software development platform and a range of applications built on DG's client/server Aviion architecture.

The DG version of LAN Manager/X will be introduced by the end of this year, according to the company.

THANKS MARGIE-PROMISE-THIS IS THE LAST TIME I'LL BORROW YOUR COMPUTERWORLD.
COMPUTERWORLD

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44.00* per year — a savings of 57% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - **10.** Manufacturer (other than computer)
   - **20.** Finance/Insurance/Real Estate
   - **30.** Medicine/Law/Education
   - **40.** Wholesale/Retail/Trade
   - **50.** Business Service (except DP)
   - **60.** Government - State/Federal/Local
   - **65.** Communications Systems/Public Utilities/Transportation
   - **70.** Mining/Construction/Petroleum/Refining/Agric.
   - **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
   - **85.** System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - **90.** Computer/Peripheral Dealer/Distr./Retailer
   - **75.** User: Other ____
   - **95.** Vendor: Other ____ (Please specify)
2. **TITLE/FUNCTION** (Circle one)
   IS/MIS/DP MANAGEMENT
   - **19.** Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   - **21.** Dir./Mgr. MIS Services, Information Center
   - **22.** Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
   - **23.** Dir./Mgr. Sys. Development, Sys. Architecture
   - **31.** Mgrs., Suprv. of Programming, Software Dev
   - **32.** Programmers, Software Developers
   - **60.** Sys. Integrators/VARs/Consulting Mgt.

   OTHER COMPANY MANAGEMENT
   - **11.** President, Owner/Partner, General Mgr.
   - **12.** Vice President, Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt.
   - **51.** Sales & Mktg. Management

   OTHER PROFESSIONALS
   - **70.** Medical, Legal, Accounting Mgt.
   - **80.** Educator, Journalists, Librarians, Students
   - **90.** Others ____ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - **A.** Mainframes/Superminis
   - **B.** Minicomputers/Small Business Computers
   - **C.** Microcomputers/Desktops
   - **D.** Communications Systems
   - **E.** Local Area Networks
   - **F.** No Computer Involvement

E4025-0

THANKS MARGIE-PROMISE-THIS IS THE LAST TIME I'LL BORROW YOUR COMPUTERWORLD.
COMPUTERWORLD

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44.00* per year — a savings of 57% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - **10.** Manufacturer (other than computer)
   - **20.** Finance/Insurance/Real Estate
   - **30.** Medicine/Law/Education
   - **40.** Wholesale/Retail/Trade
   - **50.** Business Service (except DP)
   - **60.** Government - State/Federal/Local
   - **65.** Communications Systems/Public Utilities/Transportation
   - **70.** Mining/Construction/Petroleum/Refining/Agric.
   - **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
   - **85.** System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - **90.** Computer/Peripheral Dealer/Distr./Retailer
   - **75.** User: Other ____
   - **95.** Vendor: Other ____ (Please specify)
2. **TITLE/FUNCTION** (Circle one)
   IS/MIS/DP MANAGEMENT
   - **19.** Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   - **21.** Dir./Mgr. MIS Services, Information Center
   - **22.** Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
   - **23.** Dir./Mgr. Sys. Development, Sys. Architecture
   - **31.** Mgrs., Suprv. of Programming, Software Dev.
   - **32.** Programmers, Software Developers
   - **60.** Sys. Integrators/VARs/Consulting Mgt.

   OTHER COMPANY MANAGEMENT
   - **11.** President, Owner/Partner, General Mgr.
   - **12.** Vice President, Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt.
   - **51.** Sales & Mktg. Management

   OTHER PROFESSIONALS
   - **70.** Medical, Legal, Accounting Mgt.
   - **80.** Educator, Journalists, Librarians, Students
   - **90.** Others ____ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - **A.** Mainframes/Superminis
   - **B.** Minicomputers/Small Business Computers
   - **C.** Microcomputers/Desktops
   - **D.** Communications Systems
   - **E.** Local Area Networks
   - **F.** No Computer Involvement

E4025-0

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NEW AT DEXPO EAST

The following products, services and new technologies will be announced at the Dexpo East exhibition in Boston on June 26-28.

Utilities

Integrated Software Design, Inc. will feature its On-Tap/VMS bar-code labeling and printing software package.

The product enables users to add bar-code printing capabilities to application software by placing a mark at any spot in a document where a bar code should be printed. Users can also create files with bar codes and send them to a local printer, print queue or remote printer in a network, according to the vendor.

On-Tap costs between $1,995 and $4,995, depending on type of Digital Equipment Corp. VAX configuration.

Integrated Software
171 Forbes Blvd.
Mansfield, Mass. 02048
508-339-4928

Computer-aided software engineering

Synthesis Computer Technologies, Inc. will unveil an integrated computer-aided software engineering application development system designed for the Digital Equipment Corp. VAX/VMS environment.

Case/ap is based on an advanced Cobol code generator. It enables users to define and create initial prototypes and refine them through an iterative process until a final application is completed.

Pricing ranges from $5,000 for a Vaxstation configuration to $75,000 for installation on high-end VAX systems.

Synthesis Computer
5199 E. Pacific Coast
Highway
Long Beach, Calif. 90804
213-494-4069

Applications packages

Total Tec Systems, Inc. will introduce an intelligent method of managing and using textual data.

The Nets natural English language text search system is based on a Key Concept search engine in which a user interface allows English questions and commands to be processed against textual information.

The system runs on an Intel Corp. 80386-based associative processor networked to a Digital Equipment Corp. VAX machine.

Pricing begins at $50,000.

Total Tec Systems
2 Gourmet Lane
Edison, N.J. 08837
201-906-6500

Compushare, Inc. will announce an addition to its Order Entry/Inventory Control series.

Kits, a single-level bill of materials processor, was designed for use by wholesale distributors and manufacturers.

The product runs on Digital Equipment Corp. VAX/VMS systems and is priced from $25,000 to $50,000, depending on type of CPU.

Compushare
5214 68th St.
Lubbock, Texas 79424
800-356-6568

Maintenance equipment

Intra Computer, Inc. will announce its SAM3010 disaster prevention system. The system monitors computer rooms for changes in temperature or humidity, detects problems with smoke, fire or water and automatically shuts down host systems during critical conditions when help does not arrive within a given amount of time.

The SAM3010 disaster prevention system has a list price ranging from $6,900 to $8,500, depending on the type of system being monitored.

Intra Computer, Inc.
87-46 Van Wyck
Expressway
Jamaica, N.Y. 11418
718-297-5500

Data storage

Raxco Software, Inc. will introduce two tape management systems for Digital Equipment Corp. VAX/VMS systems.

Tapecontrol was designed to monitor and manage the activity of magnetic tape storage on VAX/VMS computers. The command-line-driven system includes menu-driven interfaces to assist in data retrieval and tape library management. The product costs between $2,350 and $19,500, depending on VAX configuration.

Tapeconvert facilitates the conversion of tapes between VAX (ASCII) and IBM (EBCDIC) or other foreign tapes. Pricing ranges from $2,150 to $5,150, depending on VAX configuration.

Raxco
2440 Research Blvd.
Rockville, Md. 20850
301-258-2620

NEW PRODUCTS—SOFTWARE

System software

IBS Corp. has announced Version 3.0 of its Quick-Talk Conference for help desks and training automation.

The software package provides help desk personnel with a nondestructive, instantaneous method to capture, track and analyze data pertaining to on-line problems or pass it on to second-line support staff. The package also includes all necessary tools for performing live application training without disrupting the environment, the vendor said.

Release 3.0 is available for IBM MVS and ESA installations. Pricing for perpetual licenses or leases varies from $12,500 to $19,000.

IBS
4660 La Jolla Village Drive
San Diego, Calif. 92122
619-452-6045

Cybra Corp. has announced a user support tool for applications software developers who support different customers.

Widescope enables operators of IBM System/38 or Application System/400 systems to view users' screens displayed on other terminals, browse users' job logs and locate problems without re-creating them. Authorized programmers can reportedly initiate actions and commands that will be followed out on a user's terminal.

Pricing ranges from $640 to $3,600, depending on CPU.

Cybra
One Riverdale Ave.
Riverdale, N.Y. 10463
212-601-7100

Database management systems

At the International DB2 Users Group meeting last month, Must Software International announced enhancements to its Nomad DB2 interface.

The product now supports static access to DB2, thereby enabling Nomad applications to be predefined and bound. The interface features an integrated computer-aided software engineering tool that automates the creation of Nomad applications that provide static DB2 access.

The enhanced interface is slated to be available in the fourth quarter for $3,500 to $21,500, depending on CPU size.

Must Software
4th Floor
101 Merritt 7
Norwalk, Conn. 06856
203-845-5000

Applications packages

Computations, Inc. has developed the Commitment Management System, a mainframe software package designed to help life insurance companies manage their commitment requirements.

The on-line, real-time system provides complete document review and approval procedures; comprehensive controls for receipts, disbursements and accounting of fees incurred during the commitment process; a cash-forecasting facility; a general-ledger interface; and text and tickler notification capabilities. Pricing ranges from $50,000 to $75,000, depending on portfolio size used.

Computations
2500 Windy Ridge Pkwy.
Marietta, Ga. 30067
404-952-7854

Cincom Systems, Inc. has announced Release 7.0 of its Control: Manufacturing package.

The product includes a standardized user interface, and its manufacturing modules feature screens that were redeveloped using design standards derived after the Common User Access standards for character-based terminals.

Pricing ranges from $80,000 to $475,000, depending on type of Digital Equipment Corp. VAX/VMX or IBM MVS/VSE environment.

Cincom
2300 Montana Ave.
Cincinnati, Ohio 45211
513-662-2300

System Support Products, Inc. has announced Release 3.0 of Deskworks, an interactive spreadsheet program designed for users of IBM's Application System/400.

The upgraded software package stores spreadsheets as compressed files and includes two new commands: PRTSPR (Print Spreadsheet) and CLCSPR (Calculate Spreadsheet). These commands can be used in interactive or batch jobs to print or calculate spreadsheet edit sessions.

The product is available for a one-time license fee of $695 for all AS/400 models.

System Support Products
7620 Arlen St.
Annandale, Va. 22003
703-642-8760

NEW PRODUCTS—HARDWARE

Turnkey systems

Concurrent Computer Corp. has announced Release 2.0 of its Topswitch electronic funds transfer, automated teller machine (ATM) and point-of-sale (POS) processing system.

The product incorporates hardware and application software that can reportedly drive from 10 to 10,000 ATM or POS devices, depending on the configuration used. Topalert software automatically calls a predetermined phone number if problems occur.

A basic system that can drive 24 ATMs at 2.5 real-time ATM trans./sec. is priced at $250,000.

Concurrent Computer
106 Apple St.
Tinton Falls, N.J. 07724
201-758-7000

Processors

Harris Corp.'s Computer Systems Division has announced the Night Hawk 4400, a multiprocessing real-time computer system based on reduced instruction set computing (RISC) technology.

The system includes four Motorola, Inc. 88100 RISC processors on one board to provide processing of 80 million instructions per second. Motorola's Hypermodule CPU packaging provides the Night Hawk 4400 with M88000 RISC architecture in clusters that include one, two or four 88100 processors.

The product is slated to be available in the fourth quarter from $58,500 to $93,500, depending on configuration.

Harris
2101 W. Cypress Creek Rd.
Ft. Lauderdale, Fla. 33309
305-973-5125

I/O devices

Carroll Touch, Inc. has announced a scanning infrared touch input system for the NEC Multisync XL color monitor.

The add-on product includes an infrared touch frame with an on-board controller and a wall-mount power supply. The company's line of infrared touch systems are based on an opto-matrix frame that encompasses the computer display.

It is being sold in quantities of 100 for $713 apiece.

Carroll Touch
P.O. Box 1309
811 Paloma Drive
Round Rock, Texas 78664
512-244-3500

Distributed Logic Corp. has announced a disk controller that enables users of Digital Equipment Corp. Microvaxes to add multiple SMD/SMD-E Winchester disk drives to their systems.

The Model DQ3256 handles up to four drives with transfer rates up to 3M byte/sec. It is compatible with the DU drivers in VMS and Ultrix operating systems. Features include dynamic transfer segmentation, which facilitates data reads in multiple drive subsystems.

The product is available at a list price of $2,495.

Dilog
1555 S. Sinclair St.
Anaheim, Calif. 92806
714-937-5700

PERSONAL publishing
THE NEW WORLD OF WINDOWS WORD PROCESSORS FOR THE PC
ALSO: TypeAlign, FontSpace, TypeStyler, DesignStudio, PageMaker 4.0

MARCH 28 1990 PAGE 51
PRODUCT ANALYSIS
OS/2: THE RIGHT STUFF?
How OS/2 fares against Windows and Macintosh in the battle for top gun operating system.

CONSUMER WATCH: IS IT SAFE TO BUY A GRAY-MARKET PC?
PC WORLD
GEE, WHIZ!
LOTUS GOES GRAPHICAL WITH 1-2-3/G
Will It Make You Want to Switch to OS/2?
BLAZING BARGAINS 10 Top-Speed 386s You Can Afford
CACHE VALUES 6 Cheap Ways to Get More Bang From Your Hard Disk
BUDGET BALANCERS 4 Finance Packages for Home and Office
WINDOWS SPECIAL REPORT
Presentation Manager Software: What's Ready, What's Not
Buyers' Guide: Windows Shareware

New 32-bit Color on the Mac (page 99)
BYTE
JULY 1989 A McGRAW-HILL PUBLICATION
REVIEWS
IBM PS/2 Model 70 A21
Phar Lap 386|VMM
HOOPS
Folio Views
WingZ
A Color PostScript Printer
THE 12 TOP GUIs
Your Guide to State-of-the-Art Graphical User Interfaces
IN DEPTH
Distributed Processing
Object-Oriented Upgrades: Microsoft's Quick Pascal vs Borland's Turbo Pascal 5.5
2 Brand-New Columns
PLUS
Optical LAN Standards
HP DeskJet Plus
PixelPaint 2.0
HyperPAD
Mitsubishi's Smart Mouse

THE NATIONAL NEWSPAPER OF CORPORATE MICROCOMPUTING. OCTOBER 30, 1989, VOL. 6 NO. 43, PRICE $3.95
PC WEEK
In the Aftermath of the Earthquake:
Most Corporate Networks In California Withstand The Shock, While Borland Picks Up the Pieces
See Page 11
Graphical Desktop Suites Take Shape
Lotus, Microsoft Piece Together Office Applications Under Graphical Interfaces
Lotus Teams Up With WordPerfect For PM Interface
New Word Release Adds to Microsoft Windows Arsenal

15 YEARS OF POWER PROGRAMMING!
Dr. Dobb's JOURNAL
SOFTWARE TOOLS FOR THE PROFESSIONAL PROGRAMMER
WINDOWING SYSTEMS
Beyond The Window Dressing
- MS WINDOWS MEMORY MANAGEMENT
- X WINDOWS & 3-D GRAPHICS
SELF-ADJUSTING DATA STRUCTURES
MULTIPLEXING ERROR CODES
RISC PROGRAMMING

PC MAGAZINE
PC Labs Tests 21 Affordable 12-MHz 286 PCs
1-2-3 Release 3.0 Faster? More Powerful? Too Much Too Late?
5 Multiuser Operating Systems for DOS Apps
Find Your Way Through the Maze of OS/2 Setup Options
GRAPHICAL: The Better Interface
15 leading-edge environments deliver
- Power
- Ease of Use
- Consistency
- Multitasking

Windows
GEM
DeskMate
NewWave
OS/2 PM
Macintosh
Open Look
NeXTStep
OSF/Motif
NeWS
PM/X
Future...

Now that everyone agrees how a computer should work,

Judging by what you see on magazine covers these days, the world now wants what the Macintosh® computer has always had. And, suddenly, the idea that a personal computer should work the way people do has been embraced by virtually every major player.

Well, since "Mac-like" is the promise on every lip, this might be a good time to point out just what a Mac® is like.

What makes a Macintosh a Macintosh is not just cheerful icons, a mouse, pull-down menus and other surface manifestations.

A Macintosh is a Macintosh from the inside out. Conceived from the chip up to work intuitively and visually.

Because it's truly consistent, the entire family of Macintosh personal computers all run the same software with identical point-and-click simplicity. Because it's a true system, Macintosh printers and other peripherals all connect together quickly and logically. Just plug them in and turn them on.

Because we engineer both the hardware and its operating software, Macintosh runs with the smooth speed and precision you'd expect from any perfectly integrated design.

And because Macintosh isn't a "graphical" shell grafted on top of a character-based system, it doesn't expend lots of expensive computing power trying to do something it wasn't designed for.

Which is why, for less than it usually costs to buy the software and the high-end hardware needed for a Mac look-alike, you can have the true article.

Instead of making do with a handful of graphicized programs, you can choose from the thousands of highly innovative business appli-

*The figures don't come from us. They're from a 1990 study conducted by Diagnostic Research, Inc., among Fortune 1000 MIS managers and business computer users. Call and we'll send you a copy. © 1990 Apple Computer, Inc. Apple, the Apple logo, Mac, and Macintosh are registered trademarks, and SuperDrive and "The power to be your best" an

try the only one that actually works that way.

cations developed specifically for Macintosh over the last seven years. And instead of patiently following the long path from yesterday's MS-DOS to Windows in the interim and to OS/2 in the someday, you can make one simple step to Macintosh.

The benefits of that step, according to a new independent study* by Diagnostic Research, Inc., are considerable.

It seems people prefer a machine that works like people do. And they get more done with it: Users rated Macintosh 14% higher for overall satisfaction and 13% higher for performance than for PCs running Windows. Which, according to information managers in the same study, translated into productivity ratings which were 32% higher.

Meanwhile, what would you sacrifice by making the change to Macintosh? Not your PC files. Every Macintosh equipped with an Apple® SuperDrive™ disk drive moves information between a Macintosh and an MS-DOS or OS/2 PC on standard 3½-inch floppy disks.

And not your PC programs, either. With products like SoftPC a Macintosh can run virtually any DOS application.

We invite you to call 800-538-9696, ext. 875, for the names of your nearest authorized Apple resellers.

Then come in and see what inspired the monumental changes you've been reading about.

After all, now that everybody else is trying to sell you a Macintosh, maybe you should buy one.

The power to be your best.™

rademarks of Apple Computer, Inc. MS-DOS and Windows are registered trademarks of Microsoft Corporation. OS/2 is a registered trademark of International Business Machines, Inc. SoftPC is a registered trademark of Insignia Solutions, Inc. Fortune 1000 includes Fortune 500 and Fortune Service 500, which are registered trademarks of Time Inc.

Thursday, 30 November 1995 08:21
Sun Mon Tue Wed Thu Fri Sat
Time Allocation for Thursday, 30 November 95
Today November Avg.
Schedule
WYSE

From Forerunner to Front Runner.

The WY-150 arrived ahead of its time. It set price/performance standards that will remain for years to come. And we're still moving ahead, leading the way into the new decade. With the flexibility and connectivity that bridges the worlds of ASCII, ANSI and PCs. All while meeting the most exacting ergonomic standards at an affordable price.

And the WY-150 is compatible with a wide range of operating systems. Including UNIX, XENIX, MS-DOS, Concurrent DOS, PC-MOS, and PICK.

It also establishes a number of advanced ergonomic standards. The 78 Hz refresh rate eliminates any hint of flicker. Just as overscanning and a bezel that matches the soft, paper white phosphor erase distracting borders. (Amber and green phosphors are also available.) The oversize 10x16 cell makes each crisp character stand out clearly and vividly.

Of course, the WY-150 is backed by the service and support of Wyse. The world's leading independent terminal maker.*

The WY-150. It can lead you into the future. Today. Call 1-800-438-9973 for more information on the WY-150.

1-800-GET-WYSE

WYSE

Wyse is a registered trademark of Wyse Technology. WY-150 is a trademark of Wyse Technology. Other trademarks/owners: UNIX/American Telephone and Telegraph; Concurrent DOS/Digital Research Inc.; PC-MOS/The Software Link, Inc.; PICK/Pick Systems; MS-DOS, XENIX/Microsoft. *IDC 1988 U.S. Terminal Census.

PCs & WORKSTATIONS

MICRO BITS

James Daly

Don't hold your breath

Forget about the overpriced Macintosh portable, which is about as luggable as a cinder block. Stop moaning for a low-cost Macintosh. And who cares if the arrival date of System 7.0 moves further back each time John Sculley slips into a brand-new Italian suit?

Apple's greatest challenge today — especially in selling to the big-bucks corporate accounts it is always crowing about — has nothing to do with filling in the cracks in its current product line. Apple executives say those deficiencies are on the road to correction.

Instead, Apple needs to concentrate on filling in the blank that is driving more and more users into fits of hair-pulling frustration: Providing an adequate service and support infrastructure.

Take Kim Arledge, for instance. From her office perched high above the University of Texas campus in Austin, Arledge can see a lot of things: the magnificent beauty of the central Texas hill country, the roiling storm fronts that regularly sweep through the area, birds

Continued on page 54

Is PC industry becoming deathly dull?

Windows gala proves that showmanship now outweighs innovation

ANALYSIS

BY CHARLES VON SIMSON
and PATRICIA KEEFE
CW STAFF

Cool! It's Microsoft Corp. Chairman Bill Gates' talking head, larger than life, extolling the virtues of his pet project, the latest, super-duper version of his windowing interface for DOS.

Wow! A user gets sucked through his screen into the fantastic and wonderfully wacky world of behind-the-scenes Windows 3.0 goings-on.

Oh, brother. Attendees stand and cheer the arrival of a product that has taken years to perfect.

The thunder and glitter surrounding the recent unveiling of Windows 3.0 was such that one San Francisco radio newscaster actually compared Gates to Preston Tucker, the legendary automobile maker whose innovative designs terrified Detroit in the 1940s. That kind of talk raises the question of just how much salesmanship is too much.

The media, users and developers all promised they would not be tricked into caring about something as trivial as the next version of an interface, but most in the industry talked about it. People laughed at the lameness of his presentation but packed halls in several cities to see it.

Is Gates and his beloved Windows that sparkling? No, it's more likely that the personal computer industry has become that boring. Wall Street analysts recently have been saying repeatedly that the industry needs something more than word processors and spreadsheets to really take off again.

Preston Tucker didn't need a seven-foot video screen. He might have used one had it been available, but then he would have walked into the crowd to press the flesh, to make people buy into his idea and his product. Those at the Windows 3.0 announcement saw a stiff Gates, on the other hand, steering as far as he could manage from the crowd.

At the Windows 3.0 event, software publishers spread out across the land could be found pitching the wonder of what analysts and users received as mostly mundane products.

With few exceptions, about the best anyone could do in the way of innovation was the solitaire game that Microsoft is including in Windows. After that, it was tool kits and word processors, much the same as it has been for the last 10 years.

Continued on page 53

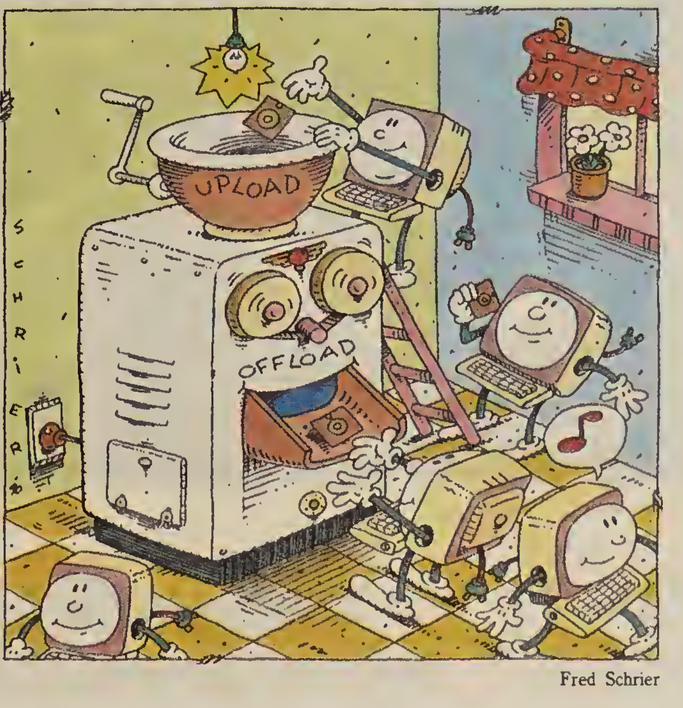
FEATURE: DOWNSIZING

Coding cooks on personal computers

BY PATRICIA KEEFE
CW STAFF

"A recent survey reported that 40% of us work more than 40 hours a week, and 20% work more than 50 hours a week. Programmers were too busy to answer the survey." — Humor item from the June 1990 "Multimedia Reporter"

Ain't it the truth. In information systems shops across the country, legions of mainframe programmers are toiling endlessly on a treadmill of backlogged applications. Standing on the sidelines are impatient users and idea-wielding executives exhorting them to code ever faster. Unfortunately, many mainframe shops have already hit the wall in terms of processing power, programming costs and applications delays.



Fred Schrier

For many companies, more big iron is not the answer. Instead, they are taking their cue from the application downsizing trend and have begun to push the development cycle for mainframe packages down to personal computers, so-called programmer workstations and the occasional minicomputer. In this way, companies can code off-line on PCs and then upload the code onto the host. In many cases, this strategy is paying off.

For example, in 1982, Bryce D. Segar was asked to take charge of a seemingly endless development cycle

Continued on page 53

The COBOL Programmer Workstation and Its Impact on Productivity
The Micro Focus Developers Seminar Schedule

The Programmer Workstation environment uses personal computers as intelligent, distributed workstations for developing, testing and maintaining host-based COBOL applications. At these Developers Seminars you will:

- ☞ See the positive impact the programmer workstation can have on programmer productivity
- ☞ See an in depth technical demonstration of the Micro Focus COBOL/2 Workbench facilities
- ☞ Watch CICS and IMS code offloaded from the host, running under the integrated Workbench testing environment
- ☞ Evaluate the workstation's potential in your organization
- ☞ Learn about latest product developments and future trends

July 10th	**Indianapolis, IN**
July 12th	**Dallas, TX**
July 12th	**Buffalo, NY**
July 19th	**Nashville, TN**
July 24th	**Arlington, VA**
Aug 7th	**Cincinnati, OH**
Aug 9th	**Boston, MA**
Aug 14th	**Los Angeles, CA**
Aug 14th	**Charlotte, NC**
Aug 21st	**Chicago, IL**
Aug 23rd	**Pittsburgh, PA**
Aug 28th	**Salt Lake City, UT**

There is *no charge* for attending a Micro Focus Developers Seminar. For more information about the Developers Seminar or about Micro Focus products call **415-856-4161**.

MICRO FOCUS®
A Better Way of Programming™

20,000 Net
We're Still Makin

THE LEADERS IN MULTIVENDOR CONNECTIVITY WIDEN THEIR LEAD.

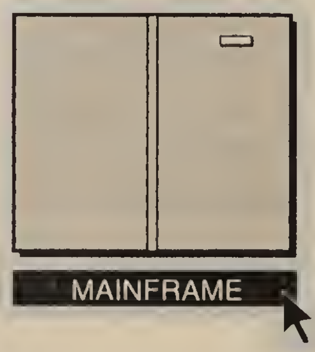
No one is more familiar with multivendor connectivity than the people at Businessland. After all, we've designed, installed, and supported more multivendor networks than anyone else.

And we're still breaking new ground—with a range of product offerings that give new meaning to the terms "host accessibility" and "connectivity." And we're doing it with a computer whose graphical user interface and integrated architecture make the host environment a lot easier to work with. Namely, the Apple® Macintosh®

THERE ARE A HOST OF REASONS TO CONNECT WITH MACINTOSH.

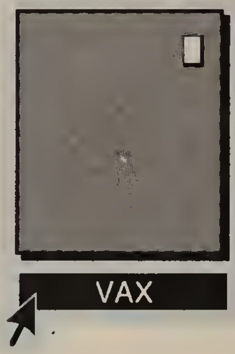
Now there's an impressive suite of tools that lets you get more out of your investment in host applications.

Thanks to third-party software known as MitemView,™ your developers can quickly create a "point and click" interface for Macintosh-to-mainframe applications without making any host modifications.



And with a unique Mac-to-host software tool set known as MacWorkstation® developers can create friendly front-ends to host applications that allow these applications to continue to evolve without modification of desktop software.

Not only does Macintosh connect into all environments, but Apple's Data Access Language makes it possible for your users to request and update information from host databases—regardless of what type of network technology, host system architecture, or DBMS they are using.



Another developer tool, MacAPPC,™ even allows the creation of Macintosh applications for cooperative processing in IBM's LU 6.2 SNA environments.

And with our newly formed alliance with KPMG Peat Marwick, Businessland can assist you in planning and developing exciting new

works Later, g Network News.

custom applications using these products.

MACINTOSH CONNECTS TO THE BEST NETWORK SERVERS.

Another exciting development in Businessland's networking portfolio is the introduction of NetFRAME high-performance network servers, also known as "network mainframes."

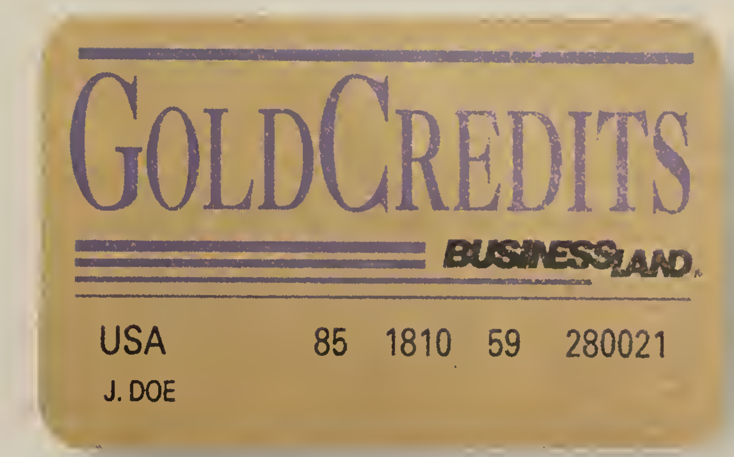
NetFRAME servers are considered to be the most powerful and reliable servers available today.* And they are particularly well suited for Macintosh—with a built-in Apple LocalTalk® connection as a standard feature.**

Not only that, NetFRAME servers support the most popular industry standard LAN operating systems, including NetWare 386 and OS/2 LAN Manager—as well as standard networking topologies like Token Ring and Ethernet.

THE BEST NETWORK SUPPORT FOR MACINTOSH.

In addition to providing all the hardware and software that is required to create a successful multivendor network, Businessland offers everything it takes to get that network working. Everything from consultation and installation to LAN administration training and support.

If you choose to set up a Gold Credit account with us, for example, your entire



organization can have access to an extensive range of support services—including Solution Line Plus, our help desk and technical hotline.

IT ALL STARTS WITH A PHONE CALL.

To find out more about Macintosh connectivity and NetFRAME servers, and to receive a copy of a recent independent study conducted among MIS managers on the productivity benefits of Macintosh, contact us at 1-800-328-8383. Ask us to fill you in on all the network news.

BUSINESSLAND®

A Different Kind of Computer Company

© 1990, Businessland, Inc. Businessland and the Businessland logo are registered trademarks of Businessland, Inc. Apple, Macintosh, AppleTalk and LocalTalk are registered trademarks of Apple Computer, Inc. All other product names are trademarks or registered trademarks of their respective holders.

*PC WEEK, May 7, 1990. **Direct LocalTalk connections dependent on NetWare 386 NLM due Fall, 1990. Macintosh connection achieved today via standard bridges.

INSTANT WORKSTATION. JUST ADD OPEN DESKTOP.

Take a look at the vast majority of graphical workstations developed over the past decade and you'll see something they all have in common:

An integrated UNIX® System environment.

Now take a look at the vast majority of businesses that have put computing power directly onto their office desktops over the past decade, and you'll see something they all have in common:

Industry-standard personal computers.

It doesn't take a computer to forecast the platform that's going to put graphical workstations on the vast majority of business and engineering desktops in the next decade:

An integrated UNIX System environment for industry-standard personal computers.

And that's what Open Desktop™ is all about.

Open Desktop is the complete graphical operating system that's built on the most popular UNIX System platform of all time—SCO™. And it lets you create your own networked, icon-driven workstation environment using the industry-standard 386 or 486 computers and peripherals of your choice.

In a single, easy-to-use, fully supported—and completely integrated—package, Open Desktop delivers:

- the full 32-bit, multitasking computing power of SCO UNIX System V/386
- compliance with POSIX™ and X/Open® standards
- an OSF/Motif™-based, Presentation Manager-compatible, graphical user interface
- distributed SQL database management services
- compatibility with existing DOS, XENIX®, and UNIX System applications and data files
- NFS™, TCP/IP, and LAN Manager networking facilities

And all at an unbelievably affordable price.

Discover the complete graphical operating system that leading companies worldwide are choosing as their development platform for the '90s—and using to turn their 386 and 486 PCs into instant workstations today.

Open Desktop from SCO.

OPEN DESKTOP™
The Complete Graphical Operating System

SCO®
THE SANTA CRUZ OPERATION

For more information, call SCO today and ask for ext. 8412
(800) SCO-UNIX (726-8649) or (408) 425-7222 FAX: (408) 458-4227 E-MAIL:...!uunet!sco!info info@sco.COM

SCO, the SCO logo, Open Desktop, and the Open Desktop logo are trademarks of The Santa Cruz Operation, Inc. UNIX is a registered trademark of AT&T in the USA and other countries. POSIX is a trademark of The Institute of Electrical and Electronics Engineers (IEEE). X/Open is a registered trademark of X/Open Company Ltd. OSF/Motif is a trademark of The Open Software Foundation, Inc. XENIX is a registered trademark of Microsoft Corporation. NFS is a trademark of Sun Microsystems, Inc. 10/89
©1989 The Santa Cruz Operation, Inc. All Rights Reserved. The Santa Cruz Operation, Inc., 400 Encinal Street, P.O. Box 1900, Santa Cruz, California 95061 USA The Santa Cruz Operation, Ltd., Croxley Centre, Hatters Lane, Watford WD1 8YN, Great Britain, +44 (0)923 816344, FAX +44 (0)923 817781, TELEX 917372 SCOLON G

BEG·BORROW·STEAL·SUBSCRIBE

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44.00* per year — a savings of 57% off the single copy price.

Address Shown: ☐ Home ☐ Business

First Name ______ MI ______ Last Name ______

Title ______ Company ______

Address ______

City ______ State ______ Zip ______

Please answer questions to qualify for this rate.

1. BUSINESS/INDUSTRY (Circle one)
- **10.** Manufacturer (other than computer)
- **20.** Finance/Insurance/Real Estate
- **30.** Medicine/Law/Education
- **40.** Wholesale/Retail/Trade
- **50.** Business Service (except DP)
- **60.** Government - State/Federal/Local
- **65.** Communications Systems/Public Utilities/Transportation
- **70.** Mining/Construction/Petroleum/Refining/Agric.
- **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
- **85.** System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- **90.** Computer/Peripheral Dealer/Distr./Retailer
- **75.** User: Other ______
- **95.** Vendor: Other ______ (Please specify)

2. TITLE/FUNCTION (Circle one)

IS/MIS/DP MANAGEMENT
- **19.** Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- **21.** Dir./Mgr. MIS Services, Information Center
- **22.** Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
- **23.** Dir./Mgr. Sys. Development, Sys. Architecture
- **31.** Mgrs., Suprv. of Programming, Software Dev.
- **32.** Programmers, Software Developers
- **60.** Sys. Integrators/VARs/Consulting Mgt.

OTHER COMPANY MANAGEMENT
- **11.** President, Owner/Partner, General Mgr.
- **12.** Vice President, Asst. VP
- **13.** Treasurer, Controller, Financial Officer
- **41.** Engineering, Scientific, R&D, Tech. Mgt.
- **51.** Sales & Mktg. Management

OTHER PROFESSIONALS
- **70.** Medical, Legal, Accounting Mgt.
- **80.** Educator, Journalists, Librarians, Students
- **90.** Others ______ (Please specify)

3. COMPUTER INVOLVEMENT (Circle all that apply)

Types of equipment with which you are personally involved either as a user, vendor, or consultant.
- A. Mainframes/Superminis
- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
- D. Communications Systems
- E. Local Area Networks
- F. No Computer Involvement

Basic Rate: $48 per year. *U.S. Only

COMPUTERWORLD

E2025-X

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

Heartbeat of hospital lies in diagnostic system

ON SITE

BY CHARLES VON SIMSON
CW STAFF

PALO ALTO, Calif. — In hospitals across the nation, sophisticated electronic heart monitors absorb enormous amounts of data on the health and progress of patients. A doctor then takes the information about blood pressure and heart rates and records it on a paper chart with a pen.

Much is lost in the translation. Even in the heart of Silicon Valley, the primitive data interpretation methods used by doctors at the Veteran's Affairs Medical Center could not keep up with the wealth of information being supplied by diagnostic equipment.

"The process was error-prone and time-consuming," said Dr. Adam Seiver, chief of general surgery at the center. "We were at the mercy of bad handwriting, errors in math and differing methods of entering data."

In November 1989, the center completed the installation of 23 Sun Microsystems, Inc. workstations aimed at supporting clinical activities, including 14 workstations in the intensive care unit.

The Unix systems run proprietary applications software from Emtek, Inc., a Tempe, Ariz.-based medical systems integrator. The units are linked to each other and to diagnostic equipment via Ethernet and Sun's Network File System protocol.

Using the computers, doctors can call up a screen that shows which patients are in which beds. To access patient information, doctors click a mouse to select the appropriate bed number. A spreadsheet format then appears, with the vertical axis showing up to 48 categories of information such as blood pressure and fluid intake/output. The horizontal axis shows the progression of time, typically in one-hour intervals.

While some information, such as fluid intake, must still be keyed into the system, much is updated automatically from electronic diagnostic machines. The hospital ultimately plans to automate even fluid intake by using infusion pumps that will communicate their activity to the network. Seiver stressed, however, that such information will still be verified by nurses or physicians.

Hospital *uses Sun workstations for better patient care*

"Before we installed the system, we could never fully trust our intake and output figures," Seiver said. "We frequently had to track as many as 14 intravenous inputs and five outputs on a patient, calculate totals and hope the handwriting was legible. Now the whole process is automatic and accurate."

In addition to automating and standardizing the collection of data, the system gives doctors a better picture of trends in a patient's condition. With a paper-based reporting system, doctors could not get a clear picture of a patient's status from the full range of diagnostic information.

"We were surrounded by all this empirical data, but because we didn't have the tools to interpret it, we had to resort to intuition for many decisions," Seiver said.

The system has also replaced paper filing in storing patient information. Every minute's worth of information is saved on the system for 24 hours; after that it can be saved as designated by doctors — typically at hourly intervals for stable patients. The on-line record gives doctors an easy method of tracking progress and reaction to treatments.

"Previously, we kept patient records at bedside for 48 hours and then stored them in file cabinets," Seiver said. "Digging out those records to review changes in health and treatments was a daunting task, particularly because it was hard to maintain them in chronological order."

Take Borland boasts with grain of salt

BY CHARLES VON SIMSON
CW STAFF

SCOTTS VALLEY, Calif. — Borland International was playing fast and loose with market numbers last week, making some heady, but unsubstantiated, claims about its momentum in the personal computer spreadsheet arena.

However, while analysts acknowledged that its Quattro Pro software has made strong gains against products from Lotus Development Corp. and Microsoft Corp., none would confirm the company's dramatic numbers.

Two weeks ago, Borland announced that its spreadsheet market share in the U.S. and Canada had increased from 5% in the second quarter of 1989 to 28% for the first quarter of 1990, according to figures derived from the Software Publisher's Association (SPA).

The SPA distanced itself from Borland's findings, saying that it provided only raw data to members and that much of the interpretation was based on confidential member-provided sales numbers. The SPA provided aggregate numbers on product shipments, and Borland used its own confidential market figures to derive its percentage of the SPA's total. "I wish they wouldn't do that," said Ken Wasch, executive director of the SPA. "That kind of claim is impossible for us to verify."

Techtel Corp., an Emeryville, Calif., market research firm, released a study last week saying that for the first quarter of 1990, Borland shipped at least one unit of Quattro Pro to as many sites in the U.S. as Lotus did of 1-2-3, Version 2.2. "That is the first time in five years of measuring the market that a competitor has matched Lotus," said Michael Kelly, president of Techtel.

Kelly agreed that the pricing of Quattro Pro may have been the most significant factor effecting its penetration, and it remains to be seen whether it can maintain its position once it returns to sustainable price levels. Techtel had no data on overall market share.

Analysts quickly pointed out that site penetration is not equal to market share. For the first quarter of 1990, Quattro held about 6% of units sold through dealers in the U.S. market vs. about 26% for Lotus, according to Audits and Surveys, Inc., a New York-based market research firm. "Borland has gained one or two percentage points, but not much more," said Carl Ravitch, senior vice-president. "The Techtel study says that selling one evaluation license to a company is the same as selling 100 platform systems."

Neither International Data Corp. nor Dataquest, Inc., two industry market research firms, could confirm Borland's findings, saying either its Q1 1990 figures were not complete or that they did not track market share in a similar manner.

"There is no question they have been shipping a lot of product," said Nancy McSharry, an analyst at IDC in Framingham, Mass. "But the $99 promotional price is so low that the buy is painless. People aren't changing platforms, they are simply using the cheap licenses in addition to Lotus and Microsoft."

Mach attack for Intel 386

ANAHEIM, Calif. — Mt. Xinu, Inc., a software development company based in Berkeley, Calif., last week announced that it will provide Mach operating system source code for Intel Corp. 80386-based computer systems.

Dubbed Mach-for-386, the source code is targeted toward the academic research community and commercial developers. According to the company, it is scheduled to be available before the end of the third quarter and will run on several common AT-bus IBM Personal Computers and compatibles, as well as on several Compaq Computer Corp., Intel and Hewlett-Packard Co. platforms.

Mach, a multiprocessing operating system, was developed at Carnegie Mellon University and was designed to provide a foundation for building modern Unix and Unix-like software systems on new architectures.

BT Tymnet Is
innovative
business
communications
worldwide

Global Network Services℠
Network Management System
Dialcom® Messaging Service
EDI•NET®
Electronic Transaction Services
LAN Connectivity Services

Contact BT Tymnet: 2560 North First Street
P.O. Box 49019 ♦ San Jose, CA 95161-9019 ♦ 800-872-7654

BT TYMNET
A British Telecom Company

Spirited.
Solid.
Strong.
Business Communications Around The World.

Toil

Purchasing Digital's full line of workstations and most popular MicroVAX™ products has never been easier.

Just pick up your telephone and call our name: 1-800-DIGITAL.

Our DECdirect™ team will help you every step of the way, with product, price and purchasing information. You'll reduce the time and paperwork of traditional purchasing, and deal directly with Digital while making your important workstation and MicroVAX purchases.

❑ ORDER WORKSTATIONS AT NEW, LOW PRICES.

Call and choose from our convenient packaged workstations. Or customize your own system over the phone.

It's the easiest way to take advantage of our new, low prices on the much-in-demand VAXstation™ 3100 and DECstation™ 3100. Plus our VAXstation™ 3520/3540 products, and our DECstation™ 2100 and 5000 family of products. Of course, our popular DECstation™ 200/300 series of PC's is also available.

❑ CALL TO ORDER POPULAR MICROVAX PRODUCTS.

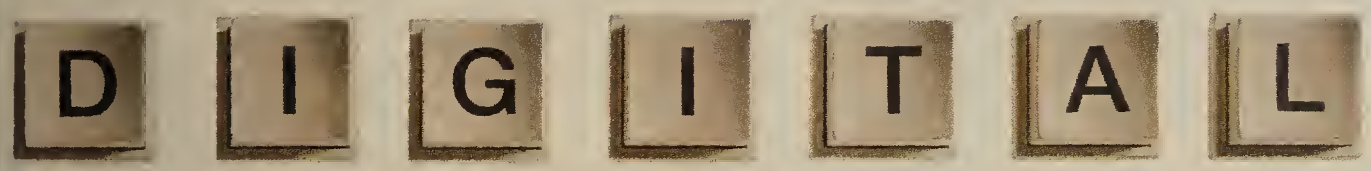
DECdirect is also your source for our most popular MicroVAX™ products, including our packaged MicroVAX™ 3100 system and custom packages of MicroVAX™ 3300/3400 and VAXserver™ 3300/3400 systems.

And while you're shopping, you can also order Digital's supplies, software, terminals, servers, drives, communication options and much more, all with the same toll-free call.

© Digital Equipment Corporation 1990. The DIGITAL logo, Digital has it now, DECdirect, VAXstation, VAXserver, DECstation and MicroVAX are trademarks of Digital Equipment Corporation.

digital™

Free.



☐ FAST ORDERING, DIRECT FROM DIGITAL.

DECdirect is the perfect complement to ordering from your Digital representative or authorized distributor. Your discounts will be automatically applied. Your purchase confirmation will be mailed the next day. And every price quoted is guaranteed for 60 days, in writing at your request.

We can even introduce you to our Electronic Store, our free on-line service that lets you browse and purchase from your desktop terminal or PC. It's another easy way to order our full workstation line, our packaged MicroVAX 3100 system, and much more.

☐ COMPREHENSIVE PRODUCT INFORMATION.

Throughout your purchasing process, you can get the most up-to-date pricing and availability information, configuration data, and warranty and service details.

All to help you make the most informed purchase possible.

☐ FREE STARTER KIT.

Call 1-800-DIGITAL and mention code AAL. That's all it takes to place an order, request technical information, or get a free DECdirect starter kit including a subscription to the DECdirect catalog and the Electronic Store Shopper's Guide.

DECdirect. It's the easiest way to get our workstation and MicroVAX products now.

Digital
has
it
now.

Clone makers slash PC prices

BY ALAN J. RYAN
CW STAFF

WESTBORO, Mass. — Leading Edge Products, Inc. and Dell Computer Corp. recently implemented hefty price cuts on their personal computer lines, and Leading Edge began shipping its $1,995 IBM Micro Channel Architecture-based PC.

Albert Agbay, president and chief executive officer of Leading Edge, said the price reductions are a reflection of pricing trends affecting the entire computer industry. He said manufacturing efficiencies, volume-related component price reductions and increased demand for PCs have driven the price cuts.

Leading Edge officials recently traveled to South Korea to meet with parent company Daewoo Telecom President Sung Kyou Park to discuss pricing, according to Bob Henderson, senior vice-president of marketing at Leading Edge.

"One of the missions of going to South Korea was to give a blow-by-blow of what we could see happening in the U.S. market," Henderson said. "We are designed to be Daewoo's eyes and ears in the U.S."

Joel Kocher, senior vice-president of U.S. sales and support at Dell, said the price cuts at his company — up to $1,100 — were implemented to more competitively position Dell's fully configured products and to enhance the company's commitment to its customers.

The Leading Edge price cuts will affect the D3/MC, an Intel Corp. 80386SX-based, IBM Personal System/2-compatible MCA product, which was originally to be priced at $2,195 but is now shipping for $1,995; the D3/25, a 25-MHz, Intel 80386-based desktop unit, which will now cost $3,995, down from $4,595; the D3/SX, a 386SX-based system, which will be available for $1,795, down from $1,995; and the D2/LPS, an Intel 80286-based, 12-MHz system, priced at $1,396, down $100 from its original price.

The pricing of the company's laptop computers will not be reduced at this time, Henderson said.

Dell's price reductions affect all standard configurations of its 286-, 386SX/DX- and Intel I486-based desktop and laptop PCs. The company's Dell System 210, a 286-based, 12-MHz PC, was cut from $2,549 to $2,349. The Dell System 310, a 386-based, 20-MHz PC with 4M bytes of random-access memory, a 650M-byte hard drive and IBM Video Graphics Array (VGA)-compatible monitor, had been priced at $7,599 and was reduced to $6,499.

Dell's System 425E, which is based on the 486 processor and the 32-bit Extended Industry Standard Architecture bus, was priced at $9,899 for a 25-MHz model with VGA color monitor and 330M-byte hard drive. The price has been reduced to $9,599.

A better look for Super VGA

BY RICHARD PASTORE
CW STAFF

A video standards association composed of monitor and video board makers voted earlier this month for a new, higher refresh rate for Super Video Graphics Array (VGA) displays. For users, the manufacturers' resolution could lead to less monitor flicker and eyestrain. For vendors, it could open up more overseas resale opportunities.

A monitor's vertical refresh rate, measured in hertz, is the number of times per second that the monitor redraws the screen image. Currently, the standard refresh rates for Super VGA displays are 56Hz or 60Hz.

"The performance levels of 72Hz . . . should lead to reduced eyestrain and tension from prolonged use of a Super VGA board and monitor," said a spokesman at Sigma Designs, Inc., a display maker and member of the 1-year-old Video Electronics Standards Association.

Higher standards in Europe

Europeans are already accustomed to higher refresh-rate displays — most European equipment redraws at frequencies greater than 70Hz. The association's endorsement of a 72Hz standard will enhance equipment compatibility and sales in those countries, according to a Video Electronics Standards Association spokesman.

The group, which held its meeting and voting at Comdex/Spring '90 in Atlanta, also endorsed design guidelines that would keep current 56Hz and 60Hz monitors compatible with the new 72Hz units.

Members of the Video Electronics Standards Association include NEC Technologies, Inc.; Hewlett-Packard Co.; Mitsubishi Electronics, Inc.; Philips Consumer Electronics; JVC Information Products; and Genoa Systems Corp.

IBM's VGA is largely recognized as the de facto standard for personal computer displays. Unit shipments of VGA cards and chip sets totaled 6.8 million last year, according to Framingham, Mass.-based International Data Corp. The figure will rise to 9.3 million this year, the research company estimated. "Super" VGA is a generic term for higher resolution VGA graphics, typically 800 by 600 pixels.

WE RENT THE SUN, THE MOON, AND THE STARS.

NOT TO MENTION PCS, PERIPHERALS, MINIS AND NETWORKS.

That's a pretty big claim. But Data Preference is ready to back it up.

With a stellar selection of new, high-performance PCs, peripherals, minicomputers, workstations and network software from the largest variety of vendors under the sun.

And with an entire galaxy of support services, including installation, on-site or return-to-depot maintenance, time-and-materials programs, a toll-free diagnostics line, and a lot more.

In fact, whatever your preference in computers, Data Preference has it. Just like we did under our old name, Leasametric Data Communications, since 1962.

We cover the entire universe of finance programs, too, including renting, leasing, and sales. Not to mention offices across the U.S. and in the U.K.

So, if you've been searching the skies for the best service and selection in computers, look up Data Preference. We'll move heaven and earth to find the best rental package to meet your needs.

DATAPreference
Incorporated

Formerly Leasametric Data Communications, Inc.

Northwest 800.343.7368, 415.574.5797 • Southwest 800.638.7854, 818.708.2669 • Central 800.323.4823, 708.595.2700 • Northeast 800.241.5841 • Southeast 800.241.5841, 404.925.7980 • London 011.44.923.897000. Copyright © 1990 Data Preference Incorporated.

When considering new computing technologies, remember the importance of compatibility.
Weigh the cost of retraining.
Bear in mind the investment you've made in your current systems. Don't overlook networking options.
Consult with experts and analysts.

Then do what

Introducing the Lotus

The complicated considerations that drive business computing decisions are suddenly a lot less complicated.

Because the Lotus® Spreadsheet Family now lets you use the industry-standard spreadsheet, 1-2-3®, on a wide range of hardware platforms and operating systems. So you can choose the most appropriate computing technology for any given task, without giving up the most advanced spreadsheet technology. And create an environment in which 1-2-3 users on platforms from desktop PCs to mainframes can work together. All while making the most of the investment you've made in Lotus spreadsheets up to now.

Each product in the Lotus Spreadsheet Family is designed to take full advantage of its specific platform. For PCs, 1-2-3 Release 2.2 and Symphony® 2.2 give you all-purpose spreadsheet capabilities that have become the industry standard. Soon-to-be-available 1-2-3 Release 3.1 provides 3D worksheets, WYSIWYG screen display, external data access and complete spreadsheet publishing.

1-2-3/G™ combines the power of 1-2-3 with a breakthrough graphical user interface designed for OS/2® and Presentation Manager.™ New 1-2-3 for UNIX* System V gives users the world's most popular spreadsheet, with new features designed to make the most of the UNIX System V/386 PC environment. And 1-2-3 for Sun allows

ever you want.

Spreadsheet Family.

you to exploit the powerful windowing, networking and multi-tasking capabilities of Sun workstations.

We've brought 1-2-3 to enterprise-wide computing systems, as well. 1-2-3 for VAX®/VMS® and 1-2-3 for ALL-IN-1® provide a vital link that lets Digital™ computers fully communicate with PCs in a DEC® network, using 1-2-3 as their common language.

And 1-2-3/M™ integrates all of the capabilities of 1-2-3 with IBM® System/370™ mainframes.

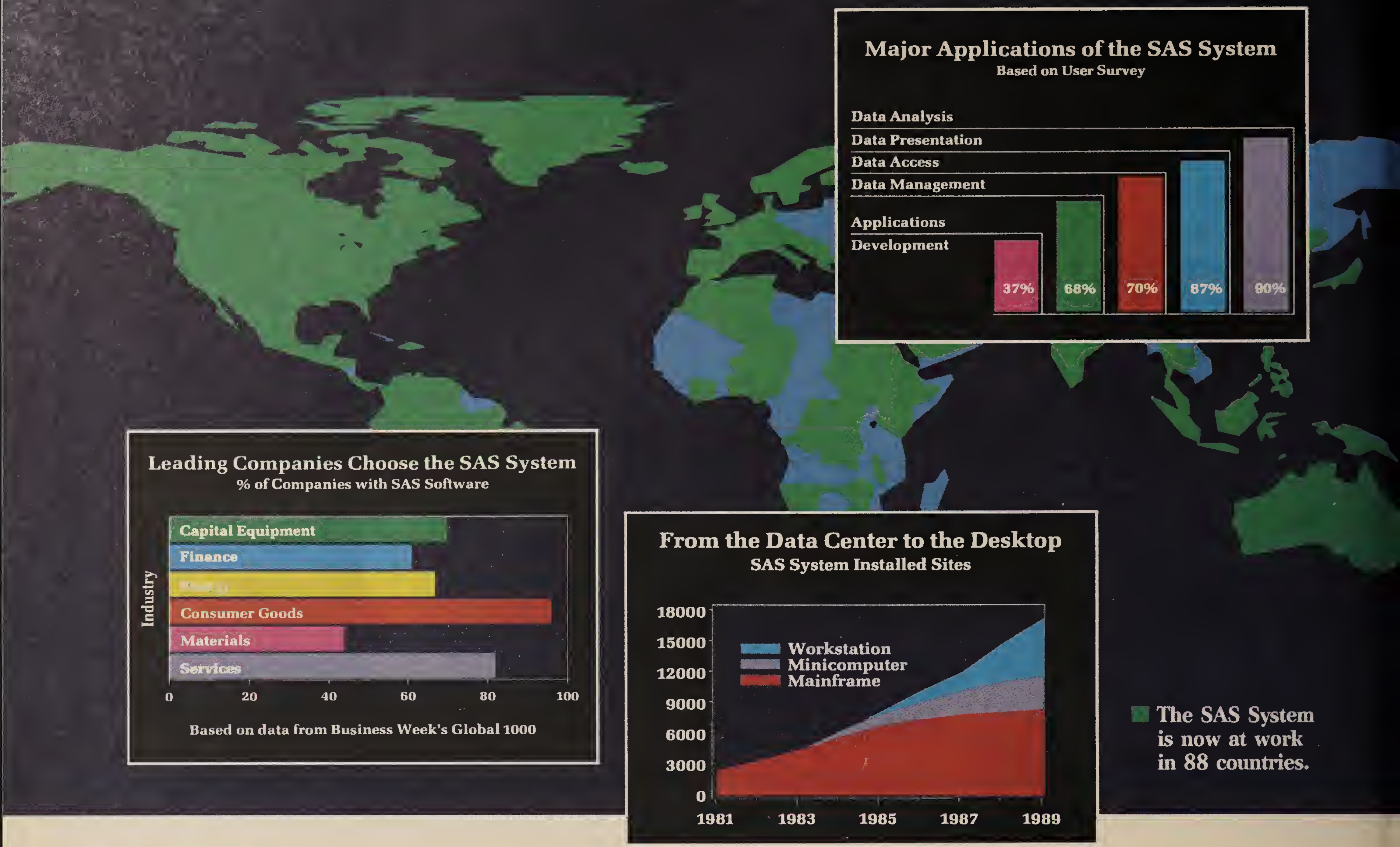
All of them are 1-2-3, with familiar commands that minimize retraining. And all are compatible, to open up totally new avenues of collaboration. Everyone throughout your company can share new and existing files, data, macros and customized applications. Regardless of the hardware involved. And work in an open, compatible spreadsheet environment company-wide.

And that means your decisions are not only easier to make. You can finally make them for the right reasons. Because instead of the trade-offs you've traditionally had to face, the Lotus Spreadsheet Family lets you focus on a single goal: how to work more productively, more efficiently, and just plain better.

And isn't that what computing is supposed to be all about in the first place?

Lotus How the World Works.™

© 1990 Lotus Development Corporation All rights reserved Lotus, 1-2-3, and Symphony are registered trademarks and 1-2-3/G, 1-2-3/M and How The World Works are trademarks of Lotus Development Corporation OS/2 and IBM are registered trademarks and Presentation Manager and System/370 are trademarks of International Business Machines Corporation VAX, VMS, All-In-1 and DEC are registered trademarks and Digital is a trademark of Digital Equipment Corporation
*UNIX is a registered trademark of American Telephone and Telegraph Company



🟩 The SAS System is now at work in 88 countries.

Why the World of Business Relies on the SAS® System.

When millions of records and billions in revenue all ride on your data, you can't settle for anything less than the world's most reliable software. That's why more than 75% of the world's most successful companies — from finance to pharmaceuticals, manufacturing to mining — depend on the SAS System. The #1 applications software system.

A World of Choices

We've designed the SAS System for practically any application that involves accessing, managing, analyzing, and presenting data — from shop-floor quality control to top-floor executive information systems. And because SAS applications run the same regardless of hardware, **you** have the power to decide where those applications belong — in the data center, at the department level, or on the desktop.

World-Class Service

The SAS System is backed by expert technical support and consulting services, continuous enhancements, and comprehensive documentation and training. All from SAS Institute Inc., one of the world's most respected names in software.

See for yourself why thousands of companies turn to the SAS System for their most strategic applications. Call us now at (919) 677-8200 and ask for your free Executive Summary and details about our free 30-day software evaluation. In Canada, call (416) 443-9811.

**The SAS® System.
More Choices
for More Applications
than Any Other Software.**

SAS Institute Inc.
Software Sales Department
SAS Circle ☐ Box 8000
Cary, NC 27512-8000
Phone (919) 677-8200
Fax (919) 677-8123

The SAS System runs on mainframes, minicomputers, workstations, and personal computers.

Copyright © 1989 by SAS Institute Inc.
Printed in the USA.

Downsizing

CONTINUED FROM PAGE 41

for a logistics system that had by then gobbled up 10 years of effort by a team of 10 Air Force Cobol mainframe programmers.

With the help of an IBM 4341 minicomputer with 4M bytes of memory and a fourth-generation language (4GL), Segar was able to complete in six months a major conversion from Cobol to Focus, Information Builders, Inc.'s 4GL. Segar, who runs Infinity Data, a San Antonio-based consulting firm, says he was able to condense 12,000 lines of Cobol code into about 2,000 lines of Focus code.

This is an extreme case, to be sure, but it demonstrates the potential benefits to be gained by prying mainframe programmers off the host and moving them onto smaller machines. According to Ralph Williamson, IBM's manager of Systems Application Architecture (SAA) marketing, the price of an IBM 3090 mainframe runs from $150,000 to $200,000 for each million instructions per second (MIPS), whereas on a 4M-byte IBM Personal System/2 Model 70, the cost per MIPS plummets to about $1,500.

Midnight programmer

Perhaps more typical of PC-based development enthusiasts is Charles Standback, IBM's consulting product administrator for SAA marketing. When he thinks back to life before IBM, Standback says he "vividly" remembers scheduling midnight programming sessions on the mainframe. "We were the low priority, and that was the only time I could get," Standback recalls. Worse, nocturnal work schedules meant costly overtime pay. "PC flexibility allows you to program when it's right for you, not the water-cooled equipment," he says.

Nowadays, mainframe programmers have access to the host during normal working hours, but system overload often leads to unacceptable response time. Other issues of contention include maintenance, project and quality control and the cost of mainframe MIPS — all of which have fueled a budding interest in the comparatively cheap, independent and graphically oriented PC-based programmer workstations.

Downsizing development cycles to programmer workstations has attracted shops such as Rockwell International Corp. in Seal Beach, Calif., which runs all of its applications on mainframes.

To free up space on its IBM 3090 mainframes and cut down on an estimated average IBM TSO cost of $15,000 per programmer per year, Rockwell is encouraging 2,500 programmers to switch to its homegrown programmer workstation. Initial returns from one test group indicate that programmer costs can be cut back to just under $8,500 per programmer per year [CW, May 21].

Boeing Computer Services in Seattle estimates that it has halved its TSO costs while encountering productivity gains of 30% to 60% among PC-based mainframe programmers. Virtually all Cobol IMS and some IBM DB2 development and stand-alone testing is done on a programmer workbench.

"It's paid off heavily, both in relieving use of mainframe resources and in terms of editing, testing and compiling applications," says Joel Massey, a Boeing business systems analyst. Compared with doing the same work on a mainframe, it took less than six months to achieve a payback on the software, he adds.

The plethora of good debugging tools available on PCs is also attractive.

Massey says PC debugging tools "are absolutely 100% better" than mainframe ones — as well as less expensive. Chris Mitchell, a project leader at RFC Intermediaries, a reinsurance brokerage in Atlanta, claims a host-based IBM CICS debugging tool can easily cost $20,000. "We got Realia Cobol and CICS for $2,000, and it's a total development environment for the PC," he says.

The options open to programmers looking at PC development range from virtually complete PC-based development that is recompiled on the host to systems that offload front-end design functions and MIPS onto the desktop, leaving code generation to the host. Computer-aided software engineering (CASE) looms large, partly because tools based on that technology first appeared on the PC. IBM Common User Access compliance is mandatory among users who are considering IBM's AD/Cycle cooperative processing architecture that enables users both to tie into the database and share information [CW, June 4]. Windowing-based shells, such as Mozart Systems, Inc.'s Mozart, provide "push-button" programming ease when combined with a layer of CASE tools.

Cost and trauma

Of course, there are issues to consider when offloading mainframe applications development to the PC. A big one is the start-up cost. Then there is the trauma facing programmers with 10 or 15 years' experience on the mainframe — who also tend to be older, better paid and have the most seniority.

Products such as IBM's CICS for OS/2 and Caseworks, Inc.'s Caseworks OS/2 Presentation Manager for Cobol can reportedly alleviate culture shock by providing the downsizing programmer with a familiar environment. This is important because frustrated programmers who have a choice have been known to head back to the mainframe ranch at the first sign of trouble. Pride and ego are issues that have to be dealt with.

The sizable investment involved in downloading the development cycle has deterred some mainframe shops. Charles Colpitts, a senior vice-president at The Travelers Corp. in Hartford, Conn., says his shop has looked at programmer workbenches, but he needs to be "100% sure" that the PC-developed code will run the same on the mainframe as it did on the PC.

Many of the packages needed to accomplish the switch first came on the market with hefty price tags. For example, some development environments alone have run as high as $2,000 per desktop. Rockwell's Programmer Workstation package initially cost $20,000 per workstation, but the company has since gotten the cost down to just under $10,000. One hidden cost is the inevitable move to a network, many users caution.

Steven Goldberg, director of engineering at Monarch Marking Systems, Inc., a maker of bar-code readers in Dayton, Ohio, concedes that it is hard to prove raw dollar savings, adding that he suspects there are more "soft" savings to be had, particularly on a network. Users say these include better designed software, easier code reviews and time savings throughout the stages of development.

PC industry

CONTINUED FROM PAGE 41

Who would have thought in 1981 that the PC business would have to resort to such a rehearsed stage show to sell the future? Time was, a kid crawled blinking out of the dim light of a garage and charmed the world. Last month, even three million dollars' worth of lights and kitsch left users and analysts yawning.

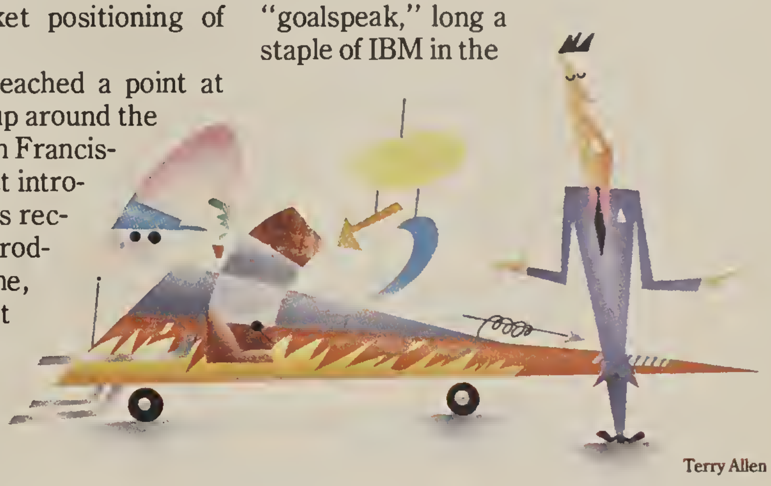
The PC business used to be about cutting-edge technology. Today, people see it as a brand management business that hinges not on blowing people away with function, but rather on creating perceptions about the market positioning of products.

The industry has reached a point at which people will line up around the block, as they did in San Francisco, to get into a product introduction. Windows 3.0 is recognized as a strong product. After all this time, DOS has finally caught up with the Apple Computer, Inc. Macintosh. Despite the strengths of the product, users and analysts may have overreacted. Closer examination of Windows 3.0 indicated that Microsoft has not reinvented DOS.

Ten years ago, it was not necessary to convince people that they needed the latest advance in technology. They were already salivating at the prospect of a desktop computer that packed a bigger punch than an 8K-byte memory.

Today, users have put the brakes on purchasing the most advanced system for the sake of it. Many said they believe they are technologically saturated and insist on proven business functionality before they spend. Users said they do not need another project manager or automated date book. No longer driven to buy, they now must be convinced that they need new bells and whistles.

Today, even Microsoft resorts to press briefings designed to correct "misconceptions" about strategic relationships, market targets and product capabilities. The industry is in an era of "goalspeak," long a staple of IBM in the mainframe world. This is seen as Microsoft's way of indicating it is committed to achieving a certain design goal, but critics note that Microsoft will not commit to delivery or a specific date — or even, in some cases, to what the technology will look like.



Terry Allen

WHY THE 1990 CENSUS IS COUNTING ON VIKING DATA ENTRY

When the U.S. Census is taken in 1990, data will be key-entered with Viking software. About 106 million households will be asked as many as 60 questions per person. Viking Data Entry (VDE) system will be used to record responses.

VDE software was selected because it is...

- Very efficient; far exceeding Census Bureau specifications.
- High-speed data entry; maximizing operator productivity.
- Error-sensitive; increasing accuracy, reducing costly reruns and delays.
- Easy to learn; virtually eliminating operator training time.

These are just a few qualities you'll learn to count on from all Viking products: Forms Manager (VFM), Data Manager (VDM), Control System (VCS), as well as VDE. **Now** available in a new Version 3.0 release on multiple computer platforms.

Contact us for all your data entry and screen form management software:

Viking Software Services, Inc.,
4808 East 67th Street, Suite 100,
Tulsa, OK 74136-4959.
PHONE: **(918) 491-6144**;
FAX: **(918) 494-2701**.

VIKING
SOFTWARE SERVICES

Daly

CONTINUED FROM PAGE 41

of every stripe.

But no matter how hard she squints, there is one object she says she's never been able to see on the horizon: decent support for the more than 10,000 Macintosh systems she has control over.

"Apple has a lot to learn about providing support for the MIS community," Arledge says disconsolately. "The Mac is not a toy anymore but a critical part of our business environment. We can't afford for it to be [down]." Instead, Arledge relies on a squad of homegrown technicians who can tear open a Mac with the ease that some people shuck oysters. It works, sure, but it's like telling the guy who buys a fleet of BMWs that he can kick around under the hood each time he hears a knock or ping.

While price/performance comparisons were the battle cry of the 1980s, users are rethinking their priorities. The 1990s promise to be the age when support services achieve paramount importance. Users are becoming more demanding, and the strength of the warranty is now nearly as important a consideration as the hardware's capability.

To be fair, Apple has taken some tottering steps toward beefing up its heretofore skimpy support offerings. It has extended its original product warranty from 90 days to one year and hooked up with third-party service providers such as KPMG Peat Marwick and EDS to handle integration and management services.

However, even Apple insiders confess they have only taken but the first steps in a long journey. "Today's corporate use clearly goes beyond the service and support we can offer today," says Morris Taradalsky, vice-president of customer support products and services.

Apple is not alone in this neglect. Service problems are so endemic to the industry that users have learned to become more self-reliant. According to a study by The Ledgeway Group, more than 40% of the desktop users surveyed saw themselves as the primary provider of services for their workstation software, network support and training needs. I'll wager that, if given the choice, most users would like to have their hardware and software support services performed by the equipment manufacturer.

Director of Apple Integrated Services James O'Gara says that Apple has been working on the problem. According to O'Gara, the firm is considering a variety of contract and subscriber services ranging from custom application development to a SWAT team that dashes out when your system goes down. But those efforts are still pilot programs, he says.

That's an awfully long time to someone thinking about purchasing Macs today. But O'Gara says it's all part of the process. "It's not a question of not doing it," he says. "It's just a question of when we'll work out the kinks."

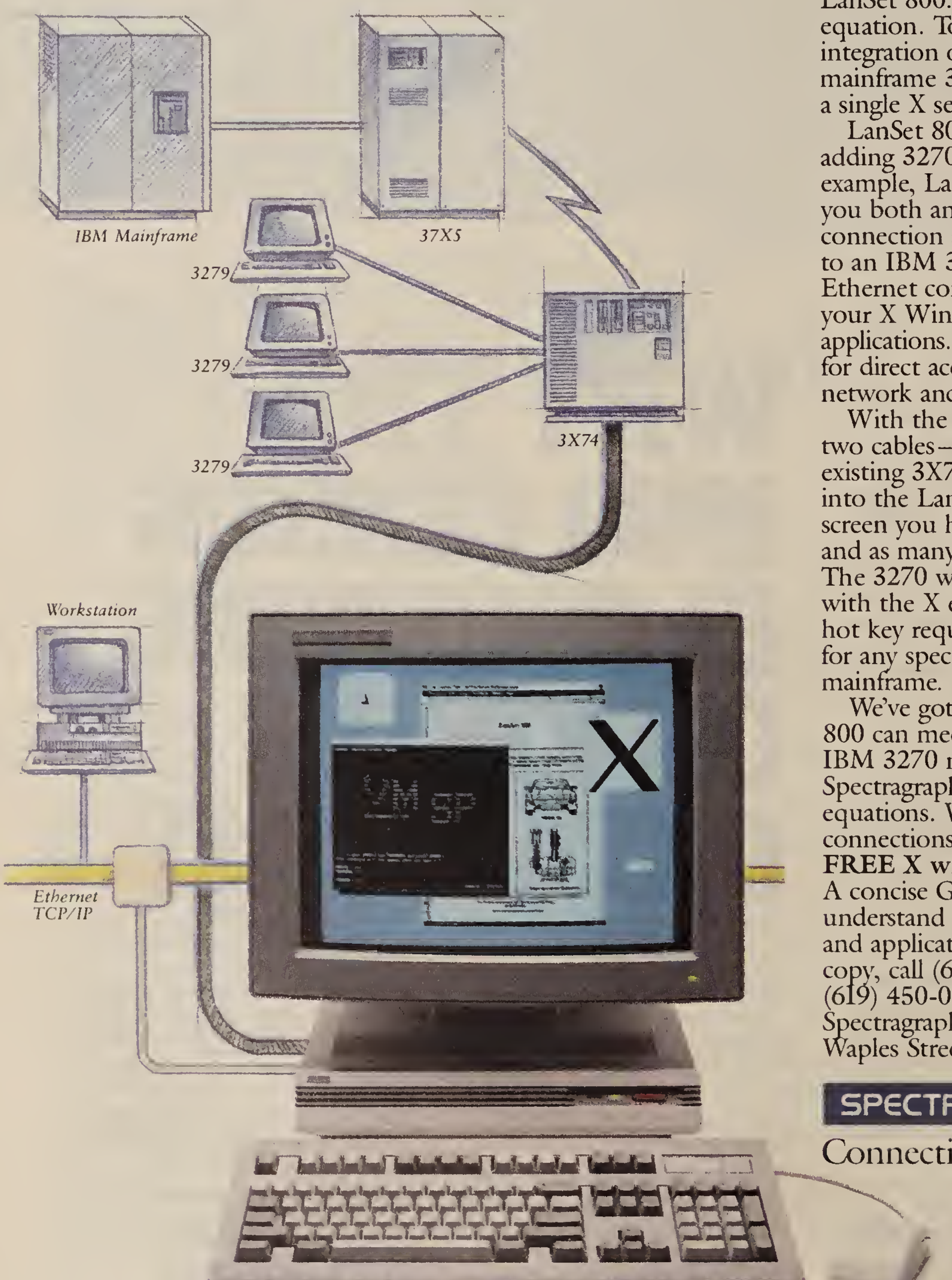
> "APPLE HAS a lot to learn about providing support for the MIS community."
>
> KIM ARLEDGE
> UNIVERSITY OF TEXAS

While the ball is still in the air, Apple may also want to consider other options. Some vendors have moved to restructure their service pricing through discounting and packaging of services, rather than charging fixed maintenance fees. The most active area has been in bundled support. Turnkey packages are more common and often include such extras as training and installation.

So if your Mac is acting up, hang in there. The Apple service/support cavalry is on the way. And, as my grandmother used to say, there isn't an electronic product on the market that doesn't benefit from a good swift kick now and then.

Daly is a *Computerworld* West Coast senior correspondent.

X+3270=LanSet



LanSet 800. A new X Window equation. To give you full integration of X Windows and mainframe 3270 connectivity in a single X server.

LanSet 800 has several ways of adding 3270 functionality to X. For example, LanSet 800/3270dc gives you both an Ethernet TCP/IP connection and direct connection to an IBM 3X74 controller. Use the Ethernet connection for access to all your X Window and other UNIX applications. Use the IBM connection for direct access to your SNA network and SNA applications.

With the LanSet 800/3270dc, two cables–Ethernet and your existing 3X74 coax–plug directly into the LanSet X server. On the screen you have a 3270 window and as many X windows as you like. The 3270 window is fully integrated with the X environment, with no hot key required. There's no need for any special software on your mainframe.

We've got lots more ways LanSet 800 can meet your X Window and IBM 3270 needs. Check out all of Spectragraphics' X Window equations. We have the right connections for you.

FREE X windows Guide.
A concise Guide to help you understand X window technology and applications. For your FREE copy, call (619) 587-6969, FAX (619) 450-0218. Or write, X-Guide, Spectragraphics Corporation, 9707 Waples Street, San Diego, CA 92121.

SPECTRAGRAPHICS®
Connecting with your ideas.

LanSet is a trademark of Spectragraphics Corporation. All other trademarks and copyrights acknowledged. © 1990 Spectragraphics Corporation.

MCA-based PCs get Freestyle

LOWELL, Mass. — Wang Laboratories, Inc. recently released a new version of the Freestyle personal computing system designed for IBM Micro Channel Architecture (MCA)-based personal computers running Microsoft Corp. Windows 2.10.

According to the company, the latest version allows users to choose the Freestyle pencil, instead of a mouse, as a pointing device in the Windows environment.

The product provides MCA-based PC users with Freestyle handwriting annotation, electronic mail and graphical desktop management capabilities. Facsimile functions are also available.

Wang is researching a Windows 3.0-compliant version of Freestyle, a company spokeswoman said, but specific product information is not yet available.

The latest release updates both the Freestyle/Light software package and the standard Freestyle system, a combination hardware and software platform that includes the electronic tablet, pencil and icon-based PC software. The core package, including the interface card and cable, costs $995 and is available for immediate delivery.

Black is black. And nothing more. Blue is blue. And that's all what's to be said. But red is best. Definitely best. Red is COMPAREX.
COMPAREX is something really different. Different, but compatible with all your computing systems. Which means COMPAREX improves the abilities of your system whatever it is. You have the real freedom: The freedom of choosing the very best.
COMPAREX offers you cleverer solutions than anyone else. For instance, to improve your computing productivity by changing some peripherals instead of continuously increasing the power of your central unit.
Hence, a better return on investment.
No wonder: COMPAREX is a company of BASF and Siemens. That's why COMPAREX

BLACK IS BLACK. BLUE IS BLUE. RED IS BEST.

people are so dedicated and feel fully responsible for their systems.
See computing world in its true colors: Pick up the color of excellence. The red one.
COMPAREX.

COMPAREX Informationssysteme GmbH
Gottlieb-Daimler-Str. 10, D-6800 Mannheim 1, West Germany
Phone 0049-621-4009-0, FAX 0049-621-4009-744

The Expert in computing.

COMPAREX
A BASF and Siemens Company

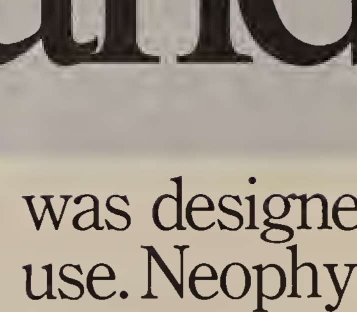
Now, all it takes is
and you're

It's only fair to warn you that exposure to new Microsoft® Windows™ version 3.0 has been linked to obsessive and habitual usage. Why?

Because with a simple click of the mouse users can connect to the network, even access and manage network resources. All without cumbersome keyboard commands.

Which means users are now able to share data. Not frustration.

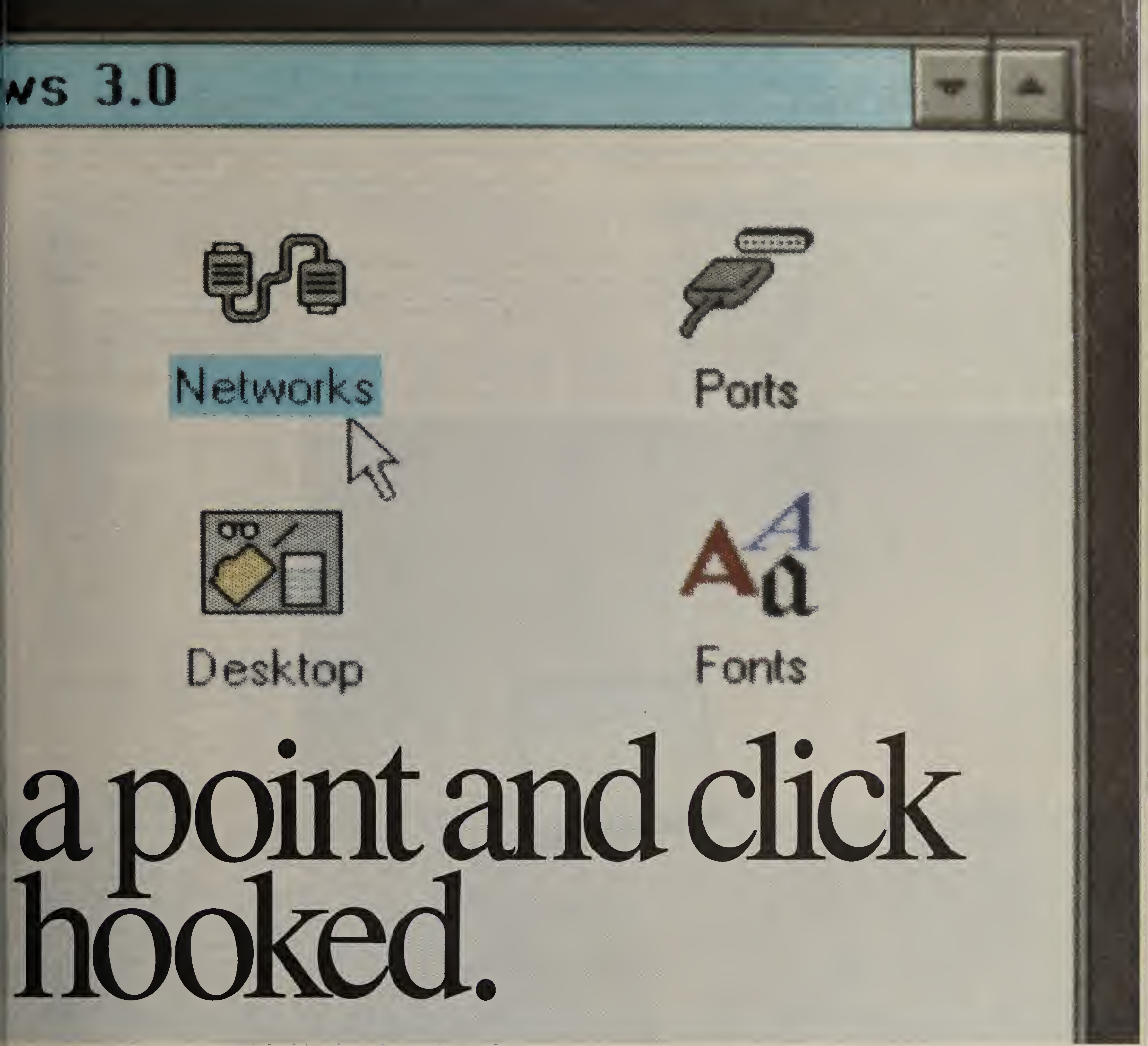
While in the interest of time, the Windows 3.0 graphical user interface was designed to be easy to learn. And use. Neophytes, not to mention troglodytes, will be up and running in no time. With virtually no training.



Now, 286/386™ machines running MS-DOS® will no longer be limited to 640K. So there are no more impediments.

Users can even enjoy a network connection and at the very same time satisfy the cravings of multiple applications.

For more information, call (800) 323-3577, Dept. L21. In Canada, call (416) 673-7638. Outside the U.S. and Canada, call (206) 882-8661. ©1990 Microsoft Corporation. All rights reserved. Microsoft, MS-DOS and the Microsoft logo



a point and click hooked.

And since Windows 3.0 has a modular setup program, a single copy now memorizes every user configuration on the network. Which means, so to speak, one size fits all.

Furthermore, Windows 3.0 has redefined its relationship with IBM® 3270 emulation programs. Users can now download corporate data and easily share it with Windows applications. Something we have come to call peaceful coexistence.

One last point. Because Windows 3.0 has been optimized for machines with 1-2 megabytes of RAM, it will go a long way towards protecting your hardware investment.

Call (800) 323-3577, Department L21, for a backgrounder that outlines how Microsoft Windows 3.0 could benefit your corporation.

We're certain that you'll agree it's a habit well worth forming.

Microsoft
Making it all make sense™

are registered trademarks and Making it all make sense *and Windows are trademarks of Microsoft Corporation. IBM is a registered trademark of International Business Machines Corporation. 386 is a trademark of Intel Corporation.*

NEW PRODUCTS

Board-level devices

Ariel Corp. has announced a plug-in card designed for IBM Personal Computer ATs and compatibles.

The MM-96 board is based on Motorola, Inc.'s 96002 Media Engine and operates at 100 million floating-point calculations per second. It functions as a development platform or an application daughter card and handles algorithms that demand deterministic or real-time results, the vendor said.

A basic configuration, which includes one 96002 engine and 1M byte of memory, sells for $3,995. Versions that include dual 96002 engines start at $5,995.

Ariel
433 River Road
Highland Park, N.J. 08904
201-249-2900

Matrox Electronic Systems Ltd. has announced a parallel processor board designed for personal computers based on Extended Industry Standard Architecture.

The MP-860 board can be configured with 2M to 20M bytes of memory. As many as eight boards can be interconnected via a message-passing bus to form a parallel processing platform that can provide 640 million floating-point operations per second and 320 million instructions per second, the vendor said.

The price of an MP-860 configured with 2M bytes of random-access memory is $6,300. The board is scheduled for release in the third quarter.

Matrox
1055 St. Regis Blvd.
Dorval, Quebec, Canada H9P 2T4
514-685-2630

Unix software

Apparel Business Systems, Inc. has announced a Unix version of its business management software system designed for use on IBM Personal System/2s and RISC System/6000 workstations.

The ABS software package covers all facets of accounting, financial management, order entry, control and component and finished goods inventory, according to the vendor.

The list price of hardware and software for the ABS Unix-based system starts at $25,000. The price of a hardware and software installation for an IBM Application System/400 begins at $60,000. A 24-user RS/6000 configuration costs $66,500.

Apparel Business Systems
Lee Park
Conshohocken, Pa. 19428
215-940-0880

Peripherals

A line of dot matrix printers designed for personal computer and desktop applications has been announced by C-Tech Electronics, Inc.

The products include the nine-pin Prowriter C-240 and wide-carriage Prowriter C-245, both of which are equipped with a 19.25K-byte buffer that enables multiple-page documents to be printed without jamming; the 24-pin Prowriter C-510 and wide-carriage C-515, both of which include a 14-page, 28K-byte buffer; the Prowriter C-610+; and a 28-pin Prowriter C-645, which features a 32K-byte buffer that can store up to 18½ pages of text.

Pricing ranges from $449 to $1,395, depending on model.

C-Tech
2515 Mc Cabe Way
Irvine, Calif. 92714
714-833-1165

Software utilities

Personics Corp. has begun shipping an add-on product for Lotus Development Corp.'s 1-2-3.

Instant Analyst offers a Smart Colors feature that can be used to highlight parts of a spreadsheet according to user-defined criteria. Common applications include displaying negative values in red, highlighting cells with values below a certain threshold and comparing sales expense figures against quotas or budgets.

The product is available for a suggested retail price of $69.95.

Personics
63 Great Road
Maynard, Mass. 01754
508-897-1575

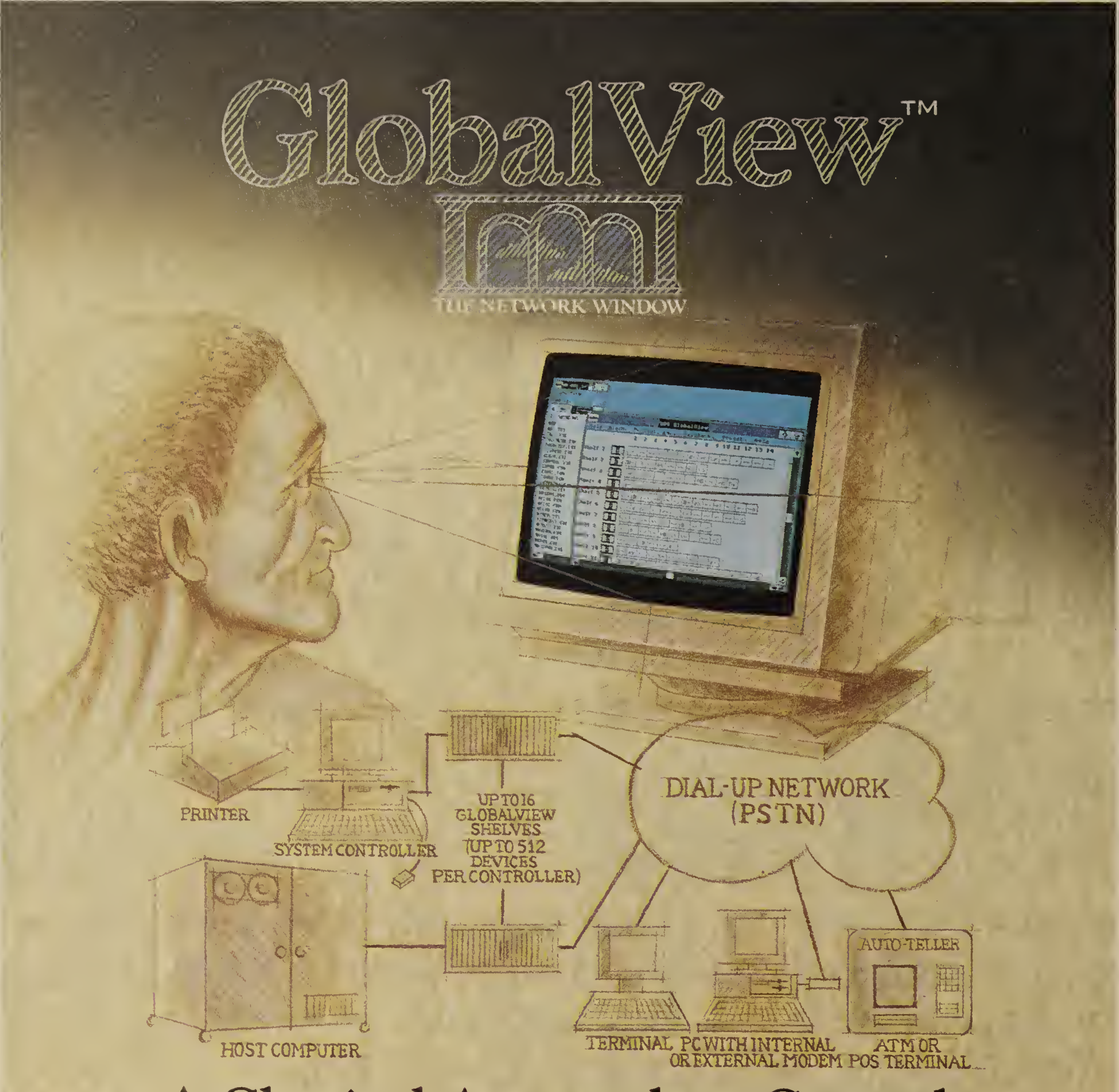
Software applications packages

Computervision has announced that its Personal Designer Revision 4.0 mechanical design software package is now available on Sun Microsystems, Inc. Sparcstation 1 workstations.

The product includes a multiple view capability, which enables users to create up to 30 views of a part and maintain an association with all views; a model mode/draw mode, which allows users to enter text and geometry as three- or two-dimensional drawing entities; and the ability to run in a multiwindow environment.

Personal Designer 4.0 costs $2,800 or $5,800, depending on the type of software package.

Computervision
100 Crosby Drive
Bedford, Mass. 01730
617-275-1800



A Classical Approach to Control Of Contemporary Dial-up Networks

The advantages of powerful, sophisticated network control systems, while available to managers of large leased-line networks, have been denied to dial-up network users. GlobalView ends that disparity.

Now you can monitor, configure and control as many as 512 local datacomm devices and any number of remote devices from a single location. You may control network security parameters, trace problems to individual devices and oversee resource allocation. Real-time and historical reports are available via color monitor, with hard copy generated for later analysis.

GlobalView is comprised of Microsoft® Windows-based software, an evolving variety of modems and other datacomm devices and a compact (7"×19") equipment rack for use with your 80286-based PC controller.

GlobalView is the classical solution to contemporary network management problems. For specifications, pricing and applications assistance, contact UDS, 5000 Bradford Drive, Huntsville, AL 35805-1993. Telephone 205/430-8000; FAX 205/430-8926.

UDS
MOTOROLA

Created by Dayner/Hall, Inc., Winter Park, Florida

DATA STREAM

Ellis Booker

Cold War redux

Just when you thought the Cold War had been transformed into a tropical love-fest, with Presidents Gorbachev and Bush jóshing and playing horseshoes on the South Lawn, the scene is doused by an ice bath of "national security concerns."

Two weeks ago, the U.S. Department of Commerce, citing national security issues, blocked US West's plan to construct a fiber-optic communications cable across the Soviet heartland. True, the decision was not a total surprise. At 565M bit/sec., the proposed transmission system, while less than half the speed of state-of-the-art systems, is still far in excess of the 140M bit/sec. ceiling maintained by the State Department.

It's certainly appropriate that export controls be maintained on countries that might use our products — be they wood chips, supercomputers or telecommunications networks — to the detriment of ourselves or our allies.

But in this instance, the reasons seem forced. At a time when the computers that can be flown to the Soviet Union are getting more and more powerful, ongoing restrictions on the networking gear is a subtle way to hobble these systems. It's like selling a Ferrari but making sure that the only available high-

Continued on page 60

LAN backup made easy

Networker puts file search ability in users' hands

BY ELISABETH HORWITT
CW STAFF

PALO ALTO, Calif. — A software tool introduced last week by Legato Systems, Inc. is said to relieve network administrators of most of the burden associated with backing up files across corporatewide networks of Sun Microsystems, Inc. systems.

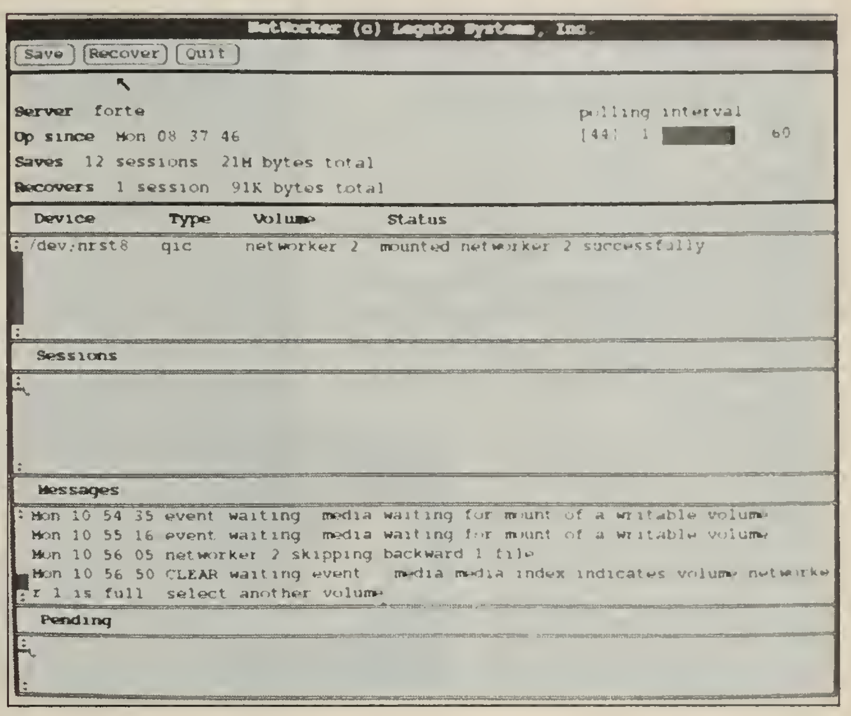
While a number of currently available products "make backup easy and fast, when it comes time to get the file back, it often takes a skilled administrator to wade through all the tapes and records and find it," Legato Vice-President of Engineering Robert Lyon said.

Networker Release 1.0 addresses this problem by making an on-line index of every file backed up, so that the "user who lost the file in the first place and is most capable of saying which one he wants can do the actual search," Lyon said. The administrator gets involved only after the search is done and the correct tape is identified, he added.

Networker may well be the only "legitimate Unix network backup product that takes advantage of characteristics inherent" in a client/server model, as well as Sun's Remote Procedure Call technology, according to Dan Kolkowitz, manager of Unix and network service development for Stanford University's Academic Computing department. As a result, "users anywhere on the network can access resource modules" that perform tasks such as backup, file indexing and status monitoring, Kolkowitz said.

One crucial feature, according to Kolkowitz, is Networker's multithreading capability, which allows multiple clients "to be backing up to the same tape at the same time."

The traditional sequential method of backing up one disk at a time requires "that someone be there" to set up the next job as soon as the previous one is done, Kolkowitz said. With Networker, however, "you don't have to worry about coordinating times, so you can launch [multiple disk backups] at the same time."



```
Server   forte                                     polling interval
Up since   Mon 08 37 46                            [44]  1            60
Saves   12 sessions   21M bytes total
Recovers   1 session   91K bytes total
Device        Type     Volume       Status
: /dev/nrst8   qic      networker 2  mounted networker 2 successfully
Sessions
Messages
: Mon 10 54 35 event waiting  media waiting for mount of a writable volume
  Mon 10 55 16 event waiting  media waiting for mount of a writable volume
  Mon 10 56 05 networker 2 skipping backward 1 file
  Mon 10 56 50 CLEAR waiting event   media media index indicates volume networke
r 1 is full  select another volume
Pending
```

Networker 1.0 *makes an on-line index of every file backed up*

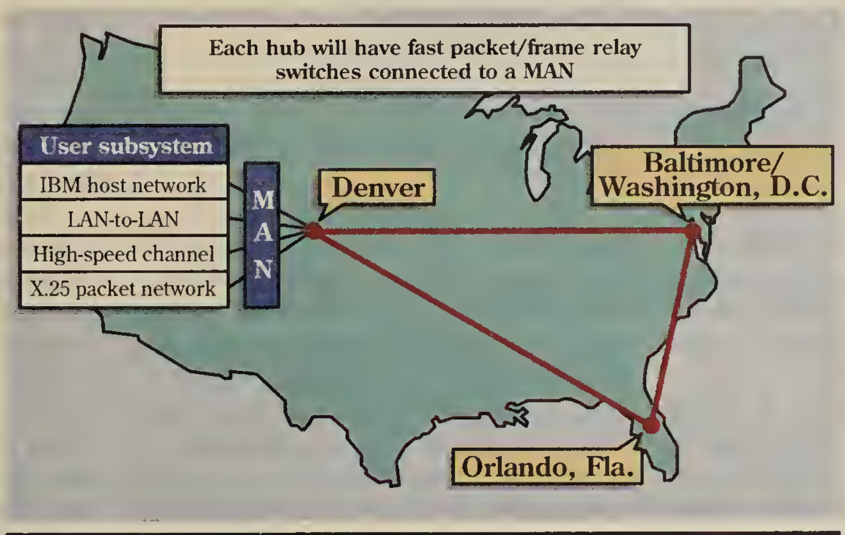
Networker can also back up a set of disks much faster than traditional products, because it does not have to wait for data from a particular disk but can access whichever I/O port has data ready, Lyon said. The system also crosses over automatically to another tape when the previous one is full, Lyon said.

The software can be programmed to automatically back up files at intervals of one day or longer, across multiple local-area networks, Lyon said.

Networker also features a windows-based status monitor that is said to notify the operator of pending work as well as potential problems, such as a disk I/O error or a file changing during the backup process, according to Lyon.

Fast packets

By the end of 1991, Martin Marietta will be using fast-packet switches at three metropolitan-area network hubs



CW Chart: Paul Mock

Opting for fast-packet tech

ON SITE

BY MITCH BETTS
CW STAFF

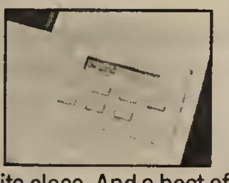
CHANTILLY, Va. — Sure, a company with at least 500 local-area networks scattered across the country could continue to string dedicated T1 circuits among them. But that wouldn't really be *managing* the corporate network efficiently.

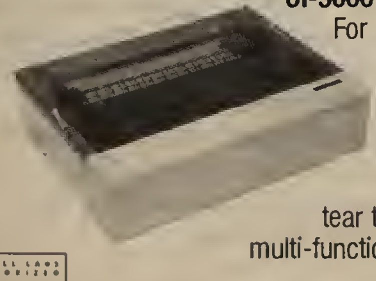
So Martin Marietta Corp., the big defense contractor with 65,000 employees, has decided to become one of the early adopters of fast-packet multiplexer technology to help it do a better job of managing large, bursty file transfers such as LAN-to-LAN connections.

"We'll be able to slow down the growth of T1 lines and utilize what we have much more efficiently," explained Duane Heidel, director of corporate communications networks.

Martin Marietta's information systems group plans to begin deploying fast-packet switches for data traffic in mid-1991, according to Jerry Tieszen, director of corporate communications architecture. He said it is

Continued on page 61





When you compare today's high-performance printers, CIE America's CI-5000 and CI-1000 always top the charts. Because each has the lowest price-to-speed ratio of any printer in its class. And a host of can't-beat-em incentives that make these printers the obvious choice.

Low Cost. Incentives.

CI-5000
For one user or many, there's little else in the class of the Novell-certified, 4-speed, dot matrix CI-5000. Virtually immune to hostile environments, the CI-5000 prints day-after-day with 18-wire precision at speeds to 540 cps. Features also include • a wide 16-inch carriage • standard zero-inch tear to eliminate forms waste • a powerful multi-function front control and display panel • preset of frequent printer configurations • and emulations including DEC's LA210/LA75/LA50, IBM's ProPrinter XL or Epson's FX-286e.

CI-1000
The versatile multi-mode, line matrix CI-1000 is perfect for the high duty cycles of multi-tasking environments. Featuring 940 lpm in draft-mode, the CI-1000 comes standard with • forms generation and bar-coding functions • thirteen international character sets • engineering/scientific notation • a 55-dBA-quiet cabinet • compatibility with a wide range of host minicomputers, mainframes and PCs • touch-of-a-button recall of task- or system-specific setups • a wide 16-inch carriage • and cost-saving zero-inch tear-off capability.

Price. Performance. Features. Reliability. What more incentives do you need? Call today!

NOVELL LABS AUTHORIZED TESTED AND APPROVED NetWare Compatible

CIE America, inc.

CIE America, Inc., 2515 McCabe Way, P.O. Box 25137, Irvine, CA 92714
(800) 877-1421 Ext. 4494

© Copyright 1990. CIE America, Inc.
All product names are trademarks of the respective manufacturers.

Making reservations can be a breeze

Cruiseship's new cooperative processing reservation system could ensure smooth sailing

ON SITE

BY ELISABETH HORWITT
CW STAFF

MIAMI — A travel reservation company is implementing some of the very latest IBM peer-to-peer Systems Network Architecture (SNA) features and services as a way to provide its travel agents with cost-effective, on-line access to up-to-the-minute information on Caribbean cruise bookings.

Cruiseship Information Systems, Inc. plans to release a DOS-based cruise reservation system in the fourth quarter that runs in a cooperative processing environment, said Brad Carter, the travel company's vice-president of operations.

Cruiseship provides electronic cruise booking services for Royal Caribbean Cruises, Inc., which recently purchased the company.

Agents will be equipped with either an IBM Personal System/2 Model 50 or a machine of equivalent power. "The software is in C, so it is pretty hardware-independent," Carter said.

The workstations will also be equipped with enough disk space to handle "a significant database" of information about Royal Caribbean products — the type of information that does not change often, such as departure schedules and itineraries, Carter added.

With this information at their fingertips, agents will be able to use Cruiseship's DOS-based reservation software package, Cruisematch, right at their desktops to process a large portion of customers' cruise arrangements and answer questions.

On-line connections to Cruiseship's and Royal Caribbean's IBM Application System/400 hosts will be pretty much limited to accessing volatile information, such as cabin availability on particular cruises, and making the actual bookings and confirmations, Carter said.

Whenever an agent signs on, the system checks to see if it needs to update the agent's files with new information.

If so, it automatically goes into batch mode and sends the updates down. If not, the two systems go right into an interactive session for making an actual reservation, Carter said.

During this transaction, Cruiseship's AS/400 acts as a liaison between the agent's PS/2 and Royal Caribbean's system, passing customer requests for a certain cabin class up to Royal Caribbean's host and passing down availability data, for example.

Once a reservation is confirmed, the agent does some local processing on the personal computer, "collecting names, citizenship, dining preferences — the guts of the cruise reservation," Carter said.

The agent then edits the reservation and passes the finished product back up to Cruiseship's system, which makes sure it is all in order and passes it on to Royal Caribbean's host, which in turn "confirms and prices it out," Carter said.

Confirmation numbers are sent back to Cruiseship, which sends them down to the agent as a finished package.

> ONCE A RESERVATION is confirmed, the agent does some local processing on the personal computer, "collecting names, citizenship, dining preferences — the guts of the cruise reservation."
>
> BRAD CARTER
> CRUISESHIP

The whole three-way interaction rides on top of IBM's PU2.1 and LU6.2 protocols, which enable workstations to communicate as peers over an SNA network — in this case, IBM Information Network's service.

Cruiseship had considered setting up a classic SNA-type network for its agents; however, peer-to-peer LU6.2-based networking won out primarily because it minimizes the need for on-line connections between the different parties.

Combining this with dial-up links to IBM Information Network's service, which only charges according to usage, should mean significant line cost savings for Cruiseship and its agents — particularly given the volume that the travel service expects to see over such connections, Carter said.

Cruiseship programmers developed the reservation application to run on top of LU6.2 software from Network Software Associates, Inc. and Spectrum Concepts, Inc. The firm said it hopes to begin implementing the software and PS/2 workstations on agents' sites in the fourth quarter.

IBM Information Network will act "solely as a go-between," routing calls from various agents and Cruiseship over its SNA network backbone, Carter said. Royal Caribbean and Cruiseship hosts will communicate over dedicated lines, he added.

Security is one major issue that became more difficult to cope with because of Cruiseship's decision to go with a peer-to-peer network. "There is nothing IBM can do for you in a peer-to-peer environment because they're not running [user queries] through their mainframe," Carter said.

The travel firm's programmers have addressed this problem by developing a security system that includes user identification and password protection, Carter said.

A chip attached to each agent's PC is accessed by Cruiseship's application programs "so that it's all encrypted when it comes to us," Carter said.

Users' queries contain embedded security information that the IBM network node passes on to the travel company, "and if it's not there, we terminate the session," he added.

GEIS eyes hospitality market

BY JIM NASH
CW STAFF

Hotel chains are growing disappointed with their reservation systems — disappointed enough to outsource the heart of their systems. At least, that is the hope of General Electric Information Services (GEIS).

GEIS, a division of General Electric Co., recently began marketing its own hotel reservation service.

Called Manor System, the service provides support and software linking IBM or compatible personal computers in each of a chain's hotels to GEIS' mainframes in Rockville, Md.

Golden Tulip, an Amsterdam-based hotel chain of about 225 buildings in almost 60 nations, is the only business currently using the system, said Mike Bradley, hotel industry market executive at GEIS.

A capable manner

Bradley said that Manor includes software for IBM 3270 emulation, hotel-chain reservation operations and individual hotel operations. It also provides gateways between hotels and airline reservation systems such as American Airlines' Sabre.

Bradley explained that 80% of the processing done with each reservation on Manor will be completed on the PCs. The mainframes, he said, store total room availability and price records. Using X.25 links, each PC receives an update of this information each night.

The same links allow the mainframes to be updated each time a reservation is confirmed by a chain's telephone reservation operation, an individual hotel's reservation desk or a travel agent.

Manor, Bradley explained, is being marketed modularly, allowing hotels to mix and match options that they require. One option offers full-color hotel representations that can be called up on a screen.

Ready for change

Bradley said a GEIS survey of 25 U.S. and European hotel companies revealed that many large chains are ready to rid themselves of their own centralized reservation systems. He claimed that hotel executives believe their systems are currently inadequate to handle the number of transactions processed.

Executives reportedly said they feel that "a substantial overhaul of their system will be necessary in the next one to five years," according to Bradley.

He declined to reveal how much the service would cost, saying that prices would vary depending on a chain's size and the options requested. The hotels surveyed were spending between $3 and $10 per reservation, Bradley said.

Booker

CONTINUED FROM PAGE 59

ways are made of dirt and strewn with rocks.

Briefs justifying the Commerce Department decision were circulating in Washington, D.C., last week. Many discussed the alleged "survivability" of fiber optics in the face of a nuclear attack. Yet an argument can be made that "survivable" communications for an enemy are, in fact, desirable. Without communications, how can the enemy surrender? Or, as the movie *By Dawn's Early Light* illustrated, how can countries avoid an accidental spiral into all-out warfare if leaders on one side cannot communicate with their own forces, let alone the enemy?

Moreover, worries that security safeguards proposed by US West and its European and Japanese partners on the project would be insufficient to prevent a "diversion" of this $500 million civilian system to Soviet military applications do not bear up under analysis.

A US West spokesman put it best when he said he strongly doubted Soviet military planners would want to use a fiber system "designed, constructed and supervised by Western countries." US West has said it will seek a Commerce Department review of the decision — an effort that isn't given much hope for success. A day after the US West ruling, the 16 other member countries of the Coordinating Committee on Multilateral Export Controls (Cocom) agreed with the U.S. to hold all fiber exports to the 140M bit/sec. level. The U.S. said it was confident it could prevent non-Cocom countries from providing the technology and snatching the Soviet contract.

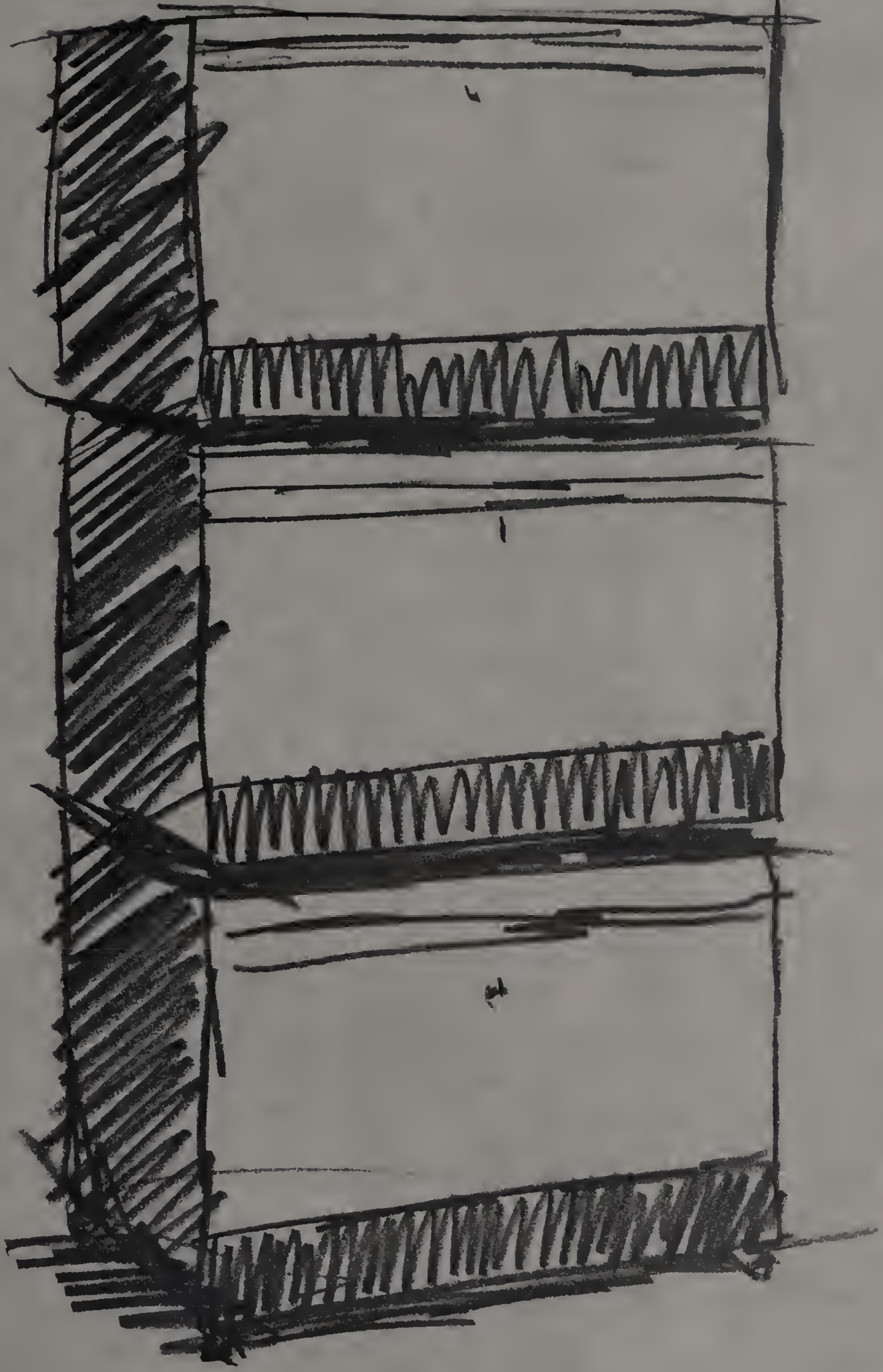
The real reason the trans-Soviet fiber line plan was kiboshed, according to Washington, D.C. insiders, was that it would have made the job of high-tech eavesdropping more difficult.

However, the Bush administration could not play up this principal objection, since this would mean first admitting to our eavesdropping activities (as if that would come as a surprise to anybody), and second, implying that we fundamentally do not trust our newfound Soviet friends, which sounds too Reaganesque and old-fashioned.

It's worth recalling that liberalized export policies serve a higher objective than improved commerce: They seek to upgrade the basic infrastructure and economies of these nations. Such policies have at their foundation the belief that access to Western know-how will make Eastern Bloc countries more prosperous, more politically stable and, ultimately, more attractive as potential markets for Western commerce.

That's still sound reasoning. And it should guide the Commerce Department's review of its decision on the trans-Soviet fiber case.

Booker is *Computerworld's* Chicago correspondent.



How everyone else gets their great ideas.

AT&T DEFINITY Communications System

AT&T

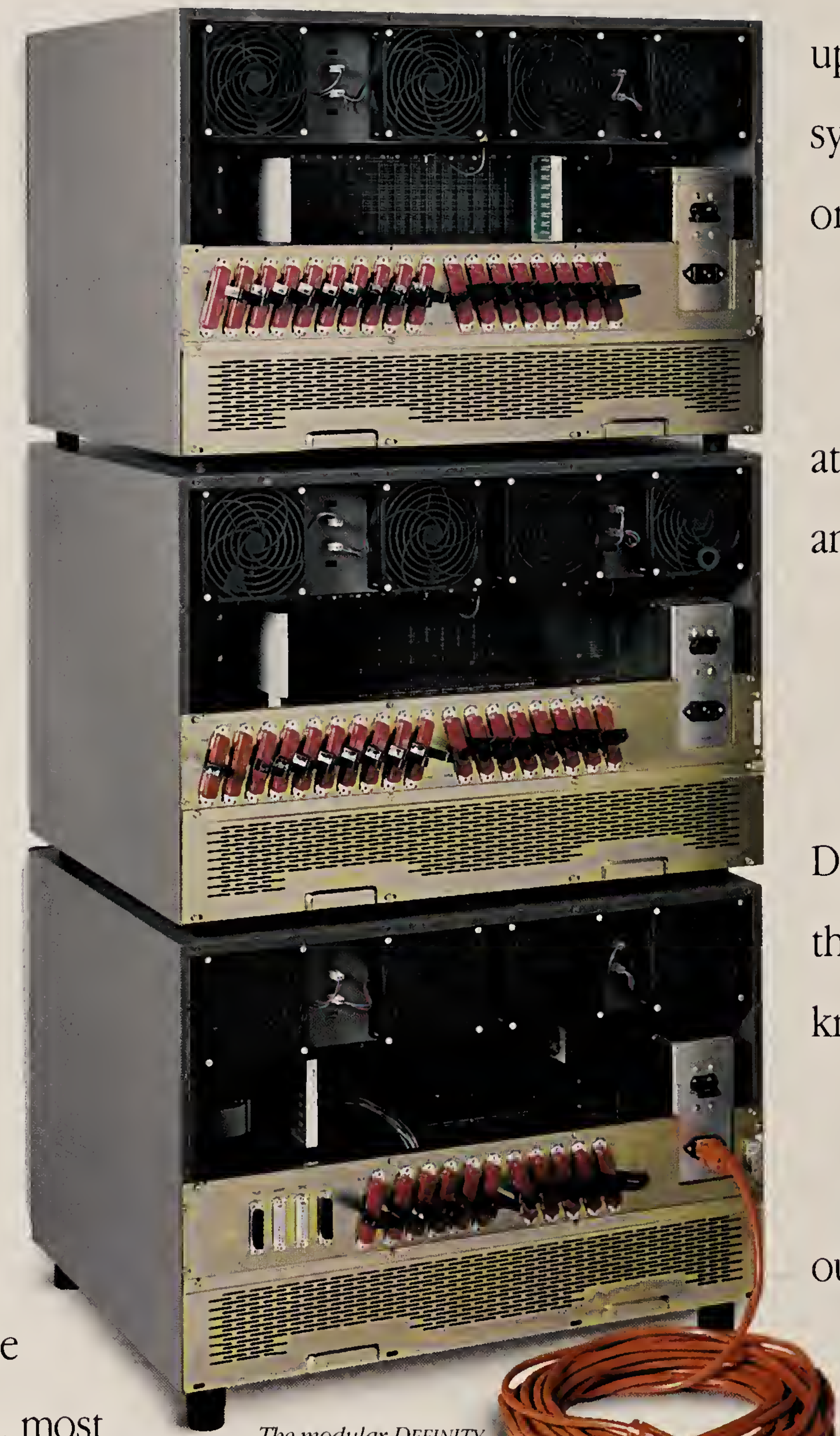
They may copy our Definity system, but they can't copy what's behind it.

The AT&T Definity® Communications System has attracted an avid following since its debut just a year ago. Customers study its ability to grow, to end obsolescence, and to protect critical telecom investments. Competitors just study it.

It all began right here.

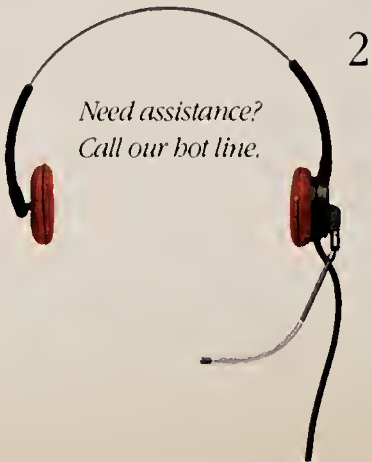
Our secret? People. The modular Definity system is an offspring of AT&T Bell Laboratories, born of the brightest, most innovative R&D minds in the entire world. Behind each system stands the largest support battalion in our industry—over 13,000 experts in Manufacturing, Product Design, Sales, Customer Service, AT&T Credit Corporation, and other specialties.

AT&T designers built critical ISDN technology into the system.



The modular Definity system grows from 40 to 30,000 lines, and beyond.

We never sleep. Many of our people work through the night, every night. We staff a 24-hour customer hot line to connect you with folks who grew up inside the Definity system. Often, they're the only help you'll need.



Need assistance? Call our hot line.

But what if... Wizards at our Remote Maintenance and Testing Service torture Definity software, fixing things that you didn't even know needed fixing.

Our RMATS staff is always thinking.

The people behind our Definity system make it superior. They also guarantee that it can never be duplicated.

To learn more, contact your AT&T Account Executive or call us at 1 800 247-1212, Ext. 362.

AT&T
The right choice.

©1990 AT&T

Gigabit net gets $15M in funds

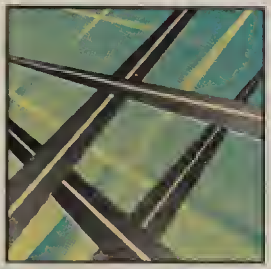
BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — In what may be an unprecedented cooperative effort by industry, government and academia, last week, $15 million in seed money was allocated to research on a nationwide fiber-optic network operating at speeds above 1G bit/sec., hundreds of times faster than the quickest networks in common use today.

The National Science Foundation (NSF) and the Pentagon's Defense Advanced Research Projects Agency are contributing $15.8 million in seed money to the project, with many times that amount coming from computer and communications companies that will provide research personnel, computer and communications technology and fiber-optic transmission capacity.

The project's primary goal is not immediate deployment but to "get research started in the technologies needed to get a multigigabit/sec. national network going," and also to make possible planned upgrades to current high-speed backbones such as the NSF's NSFnet, according to Alan Baratz, IBM department group manager, communications and concurrent systems. The current project is "parallel and complementary to" Sen. Albert Gore's (D-Tenn.) recent efforts to obtain federal funding for the high-speed National Research and Education Network project, Baratz said.

The target user population for the high-speed backbone is scientists and researchers in the academic, military and commercial sectors, who would use the multigigabit bandwidth to collaborate more effectively with one another and with computer resources around the country.


Tom Monahan

While no implementation blueprint exists, it is possible that the network could replace the domestic portion of the existing Internet, the umbrella network of research networks. Although the federal government would fund much of its development, its sponsors said it would eventually be turned over to the private sector for commercial operation.

The project, which is being managed by the Reston, Va.-based Corporation for National Research Initiatives (NRI), will establish five test networks for research in wide-area, high-speed data communications. According to Robert E. Kahn, NRI president, the experimental nets will be used to evaluate alternate network architectures, protocols, experimental switching and transmission techniques, interfaces, operating systems and user programming languages.

Network technologies will be evaluated for performance, reliability, scalability and cost, he said.

The project will test different architectures' ability to support a variety of applications, including weather modeling, remote medical imaging and teleconferencing. It will also seek ways to distribute single applications across multiple remote supercomputers and to support multisite research collaboration on wide-area networks.

The project will also look at network management, billing, privacy and other nontechnical issues.

MCI Communications Corp. will provide a data transmission hub for two of the test nets, said Ned Farinholt, an executive staff member of advanced technologies at MCI. The company will provide long-distance communications over fiber-optic pipes with a capacity of 2.4G bit/sec. In the Southwest, MCI will connect to the local exchange carriers of US West and Pacific Telesis via the Synchronous Optical Network (Sonet) interface definition, which will then provide data to local users at whatever speed they can handle. For example, data will go to the Jet Propulsion Laboratory at the California Institute of Technology at 800M bit/sec., Farinholt said.

At the other end of the country, MCI will work with Bell Atlantic Corp. and Nynex Corp. to set up a regional backbone with end points in Boston and Philadelphia. Based on Sonet technology, the backbone will support multimedia communications among IBM, Bell Communications Research, MIT and University of Pennsylvania sites, Baratz said.

These experimental wide-area networks anticipate future commercial service, said Walter Johnston, director of the Prototype Services Laboratory at Nynex. "They would form a public network reference model for future broadband services."

In another experiment, AT&T will upgrade its Xunet test net from 1.5M bit/sec. to 45M bit/sec., with future plans for combining multiple 45M bit/sec. channels into 600M bit/sec. links.

NEW DEALS

MFS lands Pittsburgh

Metropolitan Fiber Systems, Inc. (MFS), whose fiber-optic-based network services have been vying with local carriers in major cities across the country, recently initiated service on 855 fiber miles in Pittsburgh business districts and announced the network's first customer: **William M. Mercer, Inc.** MFS already has networks operational in eight other cities and plans to open networks in New York and Dallas later this year.

Newbridge Networks, Inc. recently signed a contract to provide equipment for **CBS'** nationwide backbone network. Newbridge's 3600 Main Street T1 Bandwidth Managers will route traffic between CBS' New York headquarters and broadcast center with broadcast centers in Washington, D.C. and Los Angeles and a corporate data center in New Jersey. The installation's second phase will link the larger CBS-owned and operated stations across the U.S.

Western Union Corp. and **Electronic Data Systems Corp.** (EDS) have signed a new 10-year agreement under which EDS will furnish management and financial applications systems expertise to Western Union, in addition to redesigning the network service company's information systems over the next two years. The agreement, which is valued at approximately $250 million over the 10-year term, replaces an agreement signed by the two companies in 1985.

New tools through Windows

BY JIM NASH
CW STAFF

The current flood of products being updated for Microsoft Corp.'s Windows Version 3.0 by network vendors should act to prime the pump for genuinely new network products tied to Windows, according to industry observers.

Analysts that were prodded to list new — rather than merely updated — local-area network products announced in relation to Windows 3.0 software came up empty. That, however, did not negatively color their impression of the graphical interface as a viable network component.

The increased ease of use and the ability to engage multiple applications offered by Windows will spawn new products, said Nina Burns, principal at Network Management Solutions in Menlo Park, Calif.

Ernst & Young consultant David Passmore said he expects "RAM cram" to subside, especially in the micro-to-mainframe setting, as Windows-specific products emerge. The memory-juggling capabilities of Windows will make it possible, for example, for Microsoft MS-DOS-based personal computers to support LU6.2 and PU2.1 protocols that enable them to communicate directly with a host as peers, rather than through a terminal-emulation gateway, he added.

Enabling systems to run IBM's Systems Network Architecture sessions "end to end," or from the host to the micro, Passmore said, will boost throughput and improve system fault isolation. Currently, hosts cannot see past gateways to detect problems with individual workstations, he explained.

Today, however, vendors are primarily announcing Windows 3.0 support for their existing communications products. Wall Data, Inc. in Redmond, Wash., for example, has done so for its micro-to-mainframe link, Rumba, which is said to take advantage of the Windows Dynamic Data Exchange feature. This enables users to set up interactive links between host sessions on different windows, so that changes in one window dynamically update the other, Wall Data said.

Consumer Software, Inc. in Vancouver, British Columbia, is shipping a new version of its Network Courier software that takes advantage of freed memory to allow users to send electronic mail and perform other tasks simultaneously.

Fast-packet

FROM PAGE 59

not clear whether it will be used for voice traffic as well.

Steven A. Taylor, president of Distributed Networking Associates, a consulting firm in Greensboro, N.C., said it appears that Martin Marietta will be one of the leading-edge users of fast-packet technology. "They will have many vendors to choose from in the next 12 to 18 months, because a flurry of product announcements is expected in that period," he added.

The technology combines fast-packet switching — "fast" because it eliminates error correction at intermediate nodes and has an abbreviated header — with frame relay, an emerging standard interface that the company will use to optimize bandwidth when linking LANs across the country.

A dedicated circuit is not efficiently used by bursty traffic, but fast-packet/frame-relay technology has an activity-detection feature ensuring that bandwidth is used only when needed. This ability to provide bandwidth on demand is especially attractive to Martin Marietta.

Heidel said that data traffic at the company is growing dramatically, with ever greater demands from such "bandwidth hogs" as file transfers between LANs and between engineering workstations.

Moreover, the bandwidth sometimes is needed on very short notice. "Martin Marietta may move 200 to 300 people into a building overnight to start a big project, so bandwidth can't wait 60 or 90 days. It has to be there," Heidel said.

The fast-packet technology is one element of a network architecture that Martin Marietta will be deploying in phases over the next five years. Eventually, T1 transmissions from one metropolitan area will be routed to a hub with fast-packet switches and then passed to another metropolitan hub via interstate carriers' T3 services.

In essence, the workstation-to-workstation architecture will correspond to the company's move away from the old "mainframe mentality" to distributed data processing, Tieszen said.

Tieszen said that, during the next five years, the company will migrate from its 15-year-old IBM host-to-terminal network to a new Hybrid Network Architecture that emphasizes LAN-to-LAN connections. Besides fast-packet switches, the company's Hybrid Network Architecture has the following features:

- A private X.25 subnetwork will be used, beginning in 1991, for electronic mail and electronic data interchange.
- The company will be selecting a standard set of bridges and routers for LAN-to-LAN connectivity later this year, for deployment in 1991.
- A high-speed channel will be implemented for niche applications, such as computer-aided design and manufacturing.

Tieszen said fast-packet/frame-relay "should be valid technology through the late 1990s. However, the asynchronous transfer mode of broadband Integrated Services Digital Network will come along sometime around 1995 and possibly replace that."

This was the ad for our SX.

[redacted] to 386 [redacted] fasten your seatbelts. You are about to enter the [redacted]

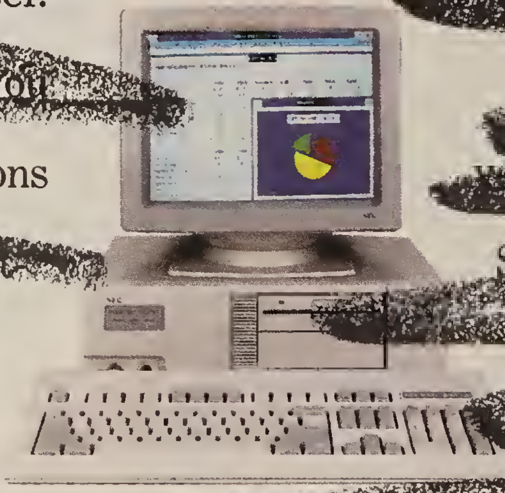
[redacted] your old PC can do, the NEC PowerMate® SX Plus can do faster. And it's hardware compatible, [redacted] bring along your current add-ons as you enter [redacted] ing—where [redacted] ster [redacted]

[redacted] NEC PowerMate SX Plus powers through [redacted] complicated CAD/CAM applications. It muscles into multitasking with [redacted] while [redacted] out a report and communicating by [redacted] at the very same time.

[redacted] into the [redacted] board, providing a stunning 16-color display [redacted] resolution. [redacted] internal storage slots offer [redacted] e. [redacted] file server for [redacted] works like 3Com® or Novell.®

And [redacted] fast track takes [redacted] ne SX [redacted] Portable SX and [redacted] 386 SX. [redacted] by NEC, the $24 billion world leader in [redacted]

Call [redacted] day. And see for your- [redacted] driving at.



The [redacted] SX Plus

NEC

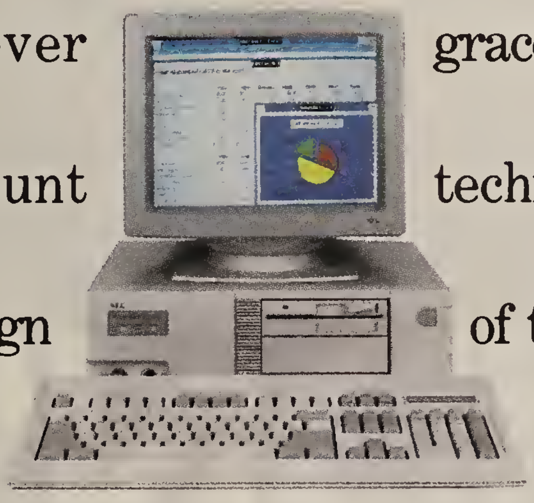
NEC Technologies, Inc., 1414 Massachusetts Ave., Boxborough, MA 01719. 1-800-NEC-INFO. In Canada, 1-800-343-4418. © Copyright 1990 NEC Technologies, Inc. PowerMate is a registered trademark of NEC Corp. 3Com is a registered trademark of the 3Com Corporation. Novell is a registered trademark of Novell, Inc. ProSpeed is a trademark of NEC Home Electronics.

Until we read this.

“When you aren’t using NEC’s PowerMate SX Plus, you might want to put it into a display case. This small-footprint machine, priced at [$2,399]* in a minimal no-hard-disk configuration, is one of the most precisely built and luxuriously finished computers that ever graced a test bench in PC Labs.

The elegant surface-mount technology of its motherboard; the complex interlocking design of the dedicated boards bearing the CPU, floppy disk drive controller, and optional high-speed memory; and the exact detailing and finish on all its parts make this a computer to admire as well as to use. Even the enhanced-style keyboard, with its light but clicky feel, is a contender for the title of best keyboard.

It isn’t cheap, but it’s one of the few computers that may be worth owning as a work of art.”



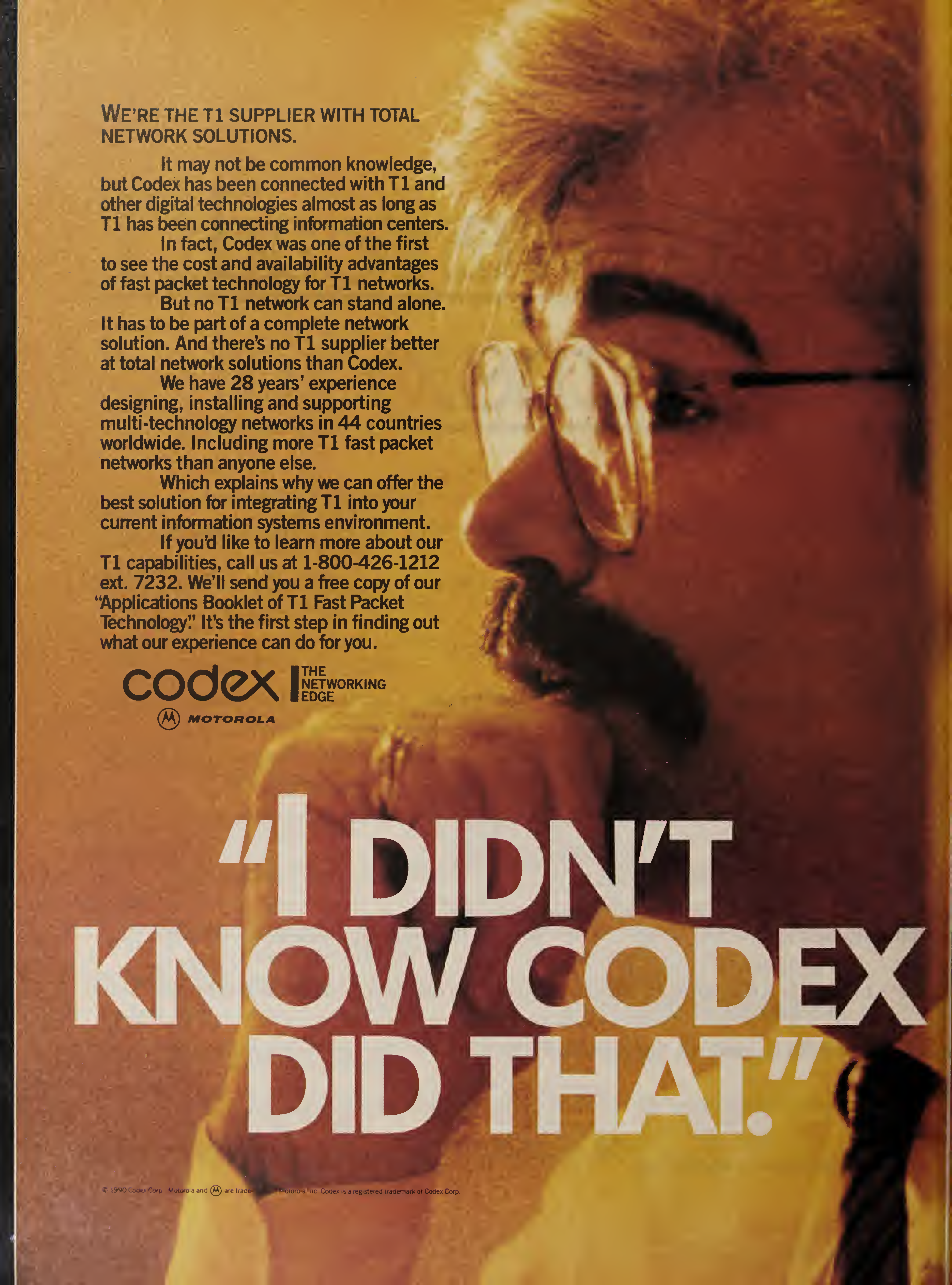
The PowerMate SX Plus

Reprinted from PC Magazine, *January 30, 1990. Copyright © 1990, Ziff Communications Company.*

NEC

---

*Manufacturer’s list price. Dealer price may vary.


"I DIDN'T KNOW CODEX DID THAT."

WE'RE THE T1 SUPPLIER WITH TOTAL NETWORK SOLUTIONS.

It may not be common knowledge, but Codex has been connected with T1 and other digital technologies almost as long as T1 has been connecting information centers.

In fact, Codex was one of the first to see the cost and availability advantages of fast packet technology for T1 networks.

But no T1 network can stand alone. It has to be part of a complete network solution. And there's no T1 supplier better at total network solutions than Codex.

We have 28 years' experience designing, installing and supporting multi-technology networks in 44 countries worldwide. Including more T1 fast packet networks than anyone else.

Which explains why we can offer the best solution for integrating T1 into your current information systems environment.

If you'd like to learn more about our T1 capabilities, call us at 1-800-426-1212 ext. 7232. We'll send you a free copy of our "Applications Booklet of T1 Fast Packet Technology." It's the first step in finding out what our experience can do for you.

codex THE NETWORKING EDGE

MOTOROLA

© 1990 Codex Corp. Motorola and Ⓜ are trade[illegible]otorola Inc. Codex is a registered trademark of Codex Corp.

NEW PRODUCTS

Protocol converters

At Dexpo East in Boston next week, Hewlett-Packard Co. will unveil its HP 18226A International Standards Organization protocol interpreter, designed for use with the HP 4972A local-area network protocol analyzer.

The product enables managers of multivendor Ethernet LANs to test systems and applications prior to network installation or to troubleshoot interoperability and efficiency problems on existing networks. It can reportedly decode protocols through the Session Layer of the Open Systems Interconnect reference model.

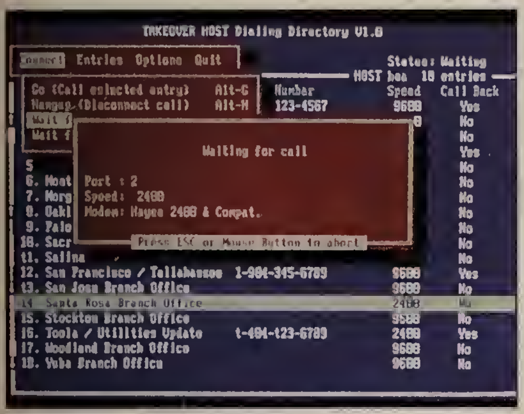
The HP 18226A costs $950. The HP 4972A LAN protocol analyzer sells for $18,350.

HP
19310 Pruneridge Ave.
Cupertino, Calif. 95014
800-752-0900

Micro-to-micro

Softklone has announced Takeover, a personal computer remote-control software package that enables users to access and take over a remote PC.

The product's dialing directory interface includes pull-down menus with keyboard and mouse control. It is equipped with 5¼- and 3½-in. disk sets and requires IBM PCs or compatibles running MS-DOS 2.0 or higher.



```
            TAKEOVER HOST Dialing Directory V1.0
 Connect  Entries  Options  Quit
                                              Status: Waiting
                                   ────── HOST box  18 entries ──
  Go (Call selected entry)   Alt-G    Number          Speed  Call Back
  Hangup (Disconnect call)   Alt-H    123-4567        9600    Yes
  Wait f                                                 0    No
  Wait f                                                      No
             Waiting for call                                 Yes
 5                                                            No
 6. Mont  Port : 2                                            No
 7. Morg  Speed:  2400                                        No
 8. Oakl  Modem: Hayes 2400 & Compat.                         No
 9. Palo                                                      No
10. Sacr        Press ESC or Mouse Button to abort            No
11. Salina                                                    No
12. San Francisco / Tallahassee  1-904-345-6789       9600    Yes
13. San Jose Branch Office                            9600    No
14  Santa Rosa Branch Office                          2400    No
15. Stockton Branch Office                            9600    No
16. Tools / Utilities Update     1-404-123-6789       2400    Yes
17. Woodland Branch Office                            9600    No
18. Yuba Branch Office                                9600    No
```

Softklone's *Takeover features pull-down menus*

The list price for software for the host and guest PCs is $295.

Softklone
Suite 100
327 Office Plaza Drive
Tallahassee, Fla. 32301
904-878-8564

Electronic mail

AT&T and Voicecom Systems, Inc. have developed a network-based voice messaging service.

AT&T Voice Mail enables users to create, process and receive voice messages nationwide at any time of day, seven days a week. The service includes an 800 number that customers can dial to leave messages or place orders and a 24-hour help line.

A one-year contract costs $9 to $12 per mailbox, plus usage and 800-line charges. Customers who purchase more than 50 mailboxes will not have to pay mailbox or usage charges for 90 days, according to the vendor.

Clients who switch from competitive services will have installation charges waived. Both offers expire June 30.

AT&T
55 Corporate Drive
Bridgewater, N.J. 08807
201-658-6000

Western Union Corp. has announced an integrated electronic messaging program that allows users of Digital Equipment Corp. VAX systems to send documents directly from the systems on which they were made.

Office Access links users of DEC VAX and Microvax systems with Western Union's worldwide electronic mail services. It supports public messages and private directories within VMS Mail and operates with DEC's All-In-One, the vendor said.

A license fee for Office Access costs between $2,000 and $10,000, depending on the type of DEC system used.

Western Union
One Lake St.
Upper Saddle River, N.J. 07458
201-818-5000

Links

At Dexpo East in Boston next week, Netcor, Inc. will announce a local-area network interconnection device that provides a repeater interconnection between standard Ethernet (10 Base5) coaxial segments and thin Ethernet (10 Base2) coaxial segments.

The NC-208 10-segment local Ethernet repeater complies with the Ethernet V2/IEEE 802.3 repeater specifications for carrier sense multiple access with collision detection 10M bit/sec. operation.

The product lists for $2,495 and is available 60 days after receipt of order, according to the vendor.

Netcor
850 Auburn Court
Fremont, Calif. 94538
415-623-3700

Simpact Associates, Inc. has announced a line of X.25 connectivity products available for VAXBI bus, Digital Equipment Corp. Q-bus and Motorola, Inc. VMEbus systems.

Continued on page 66

To find out how easy it is to convert DCA's new IRMA from standard to MCA bus, flip the page.

Continued from page 65

The CPI 2101 and VCI 2000 series implement all CCITT X.25 specifications.

The CPI 2101 is available for VAXBI bus and Q-bus systems running under DEC VAX/VMS, Ultrix and AT&T Unix System V operating systems. The VCI 2000 is available for VMEbus systems running under Unix System V, University of California at Berkeley Unix 4.2 and Vxworks operating systems.

Pricing for the CPI 2101 series ranges from $9,975 to $16,250. VCI 2000 series products cost between $5,800 and $7,200.

Simpact
9210 Sky Park Court
San Diego, Calif. 92123
619-565-1865

Gateways/Bridges/ Routers

Cisco Systems, Inc. has announced a dynamic routing protocol that enables users to build operational computer networks based on the International Standards Organization's Open Systems Interconnect model.

The Interior Gateway Routing Protocol Intermediate System-Intermediate System (IGRP IS-IS) routing protocol can automatically adapt to changes in network topology and perform real-time calculations of traffic, delays and line reliability to determine the best routing paths, the vendor said.

The IGRP IS-IS is offered as a standard feature with all of Cisco's internetwork routers, whose starting prices range from $8,000 to $18,000, depending on model.

Cisco Systems
1525 O'Brien Drive
Menlo Park, Calif. 94025
415-326-1941

OST, Inc. has announced Ebase 2000, a value-added network processor that combines the switching power of a data communications node with powerful processing intelligence.

The product, which is based on multiple Motorola, Inc. 68020 Application Processing Units, can implement the Unix operating system and run any Unix application that is compatible with AT&T Unix System V, Release 3. Outside communications are provided via X.25 communications cards that handle up to 200 packet/sec. at line speeds of 64K bit/sec.

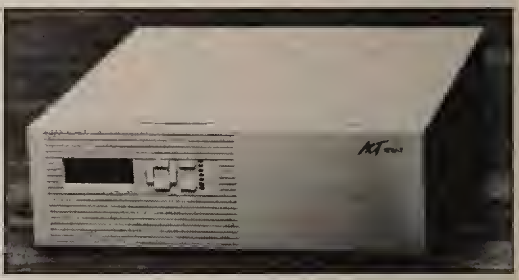
Pricing ranges from $30,000 to $100,000.

OST
14225-F Sullyfield Circle
Chantilly, Va. 22021
703-817-0400

Front ends/ Multiplexers

Advanced Compression Technology, Inc. has introduced a multiplexer that integrates voice, data and facsimile channels over 48K to 128K bit/sec. digital transmission facilities.

The SDM-T was designed with five medium-speed channels (up to 19.2K bit/sec.) for synchronous or asynchronous data, a high-speed data channel (up to 64K bit/sec.) for connecting local-area networks to other LANs and up to four Group 3 fax relay channels.



ACT's *SDM-T multiplexer*

The price of a basic unit is $2,400, and a configuration with six data and two voice channels costs $6,000. The product is scheduled to ship next month.

ACT
31368 Via Colinas
Westlake Village, Calif. 91362
818-889-3618

Wide-area networking hardware

Alantec has announced a T1 interface module for its Multilan switch (MLS) that links up to eight local-area networks with a T1 wide-area network connection.

The T1IM supports standard and fractional T1 connections and enables the MLS to multiplex LAN traffic with existing T1 voice traffic without an increase in transmission charges, the vendor said. Each T1 channel on the MLS can be used for voice or data.

The T1IM is available 30 days after receipt of order for $3,300; the basic price for the MLS is $8,800.

Alantec
101 Hammond Ave.
Fremont, Calif. 94539
415-770-1050

Racal-Quanta has announced Premnet 5000, a 100M bit/sec. fiber-optic backbone designed for premises distribution and local-area network applications.

The product can transport various data or voice interfaces in LANs or wide-area networks. It includes multi-interface nodes that are supported by 100M bit/sec. fully redundant backplanes. Its nodes can also be used in point-to-point, ring or star configurations, according to the vendor.

A basic unit with one interface costs $7,600.

Racal-Quanta
5415 E. La Palma Ave.
Anaheim, Calif. 92807
714-970-2966

You got the idea.

You've never seen anything like IRMA 3 Convertible™ from DCA® It's the only terminal emulation board that works on both a standard and MCA bus.

So now you can buy the best in micro-to-mainframe communications, and protect your investment, even if you change PC architectures.

You see, IRMA 3 can run on all current PCs. It uses an exclusive dual bus design that enables it to provide terminal emulation in PCs with the standard AT bus architecture or, by just flipping it over, it provides the same function in IBM® PS/2®'s using Micro Channel Architecture.

For even more flexibility, the IRMA 3 Convertible is capable of CUT or DFT-mode emulation.

You can use DCA's emulation software: E78 Plus™ for DOS and OS/2® IRMAX DFT,™ 3270 APA Graphics,™ Windowlink™ for IRMA, as well as IBM's software, including IBM OS/2 Extended Edition. And it lets you directly connect the most cost-effective cabling solution for your needs: coax or twisted-pair.

For more information on the exciting new IRMA 3 Convertible call 1-800-241-IRMA ext. 59E.*

In this complex, ever-changing technology environment, you're not going to find a more flexible connectivity product.

Going forward, or backward.

*Or call 1-404-442-4500 ext. 59E. © 1990 Digital Communications Associates, Inc. All rights reserved. DCA is a registered trademark and IRMA 3, E78 Plus, IRMAX DFT, 3270 APA Graphics and Windowlink are trademarks of Digital Communications Associates, Inc. All other brand and product names are trademarks or registered trademarks of their respective owners.

5 Largest EEC Importers
European Economic Community
Member
Nonmember
Fourth Quarter Sales in Europe
(Total Units)
W. Germany
Belgium
Italy
France
U.K.
Shoes
Hats
Belts
Gloves
RUSH QUARTERLY SALES FIGURES — ALSO — NEED GRAPH FOR BOARD MEETING.
URGENT
PLEASE CALL
WILL CALL AGAIN
RETURNED YOUR CALL
BROWNING PHARMACEUTICALS
Internal Memorandum
TO: Drug Applicatio
FROM: Lab 041B
RE: Product #2298 Clin
Attached are the clinical trials results fo FDA submission. We will have results fr remaining test groups by Friday...two wee of schedule!
Note that the initial results show that our origin lab results were correct.

The More Important Your Data, The More You Need The SAS® System.

Data as critical as yours demand the SAS System, the world's leading data analysis and presentation software. Whether you're projecting regional sales into the next quarter or economic trends into the next decade, you can't afford to risk your results — or your reputation — on anything less.

Only the SAS System gives you immediate access to over a hundred powerful, practical, *proven* tools for every conceivable application: data access and management . . . reporting and graphics . . . business planning, financial management, and decision support . . . project management . . . quality improvement . . . and applications development. And because the SAS System is modular, you can add new capabilities as your needs grow and change.

You'll also receive expert technical support, documentation, and training. All from SAS Institute Inc., the number one name in data analysis.

Yours for 30 Days . . . FREE.

Find out why world leaders in business, industry, government, and education rely on the SAS System. For a free 12-page SAS System executive overview, plus details about a no-risk software evaluation, give us a call at (919) 677-8200. In Canada, call (416) 443-9811.

The SAS® System. More Choices for More Applications than Any Other Software.

SAS Institute Inc.
Software Sales Department
SAS Circle ☐ Box 8000
Cary, NC 27512-8000
Phone (919) 677-8200
Fax (919) 677-8123

The SAS System runs on mainframes, minicomputers, workstations, and personal computers.

SAS is a registered trademark of SAS Institute Inc.

Copyright © 1989 by SAS Institute Inc.
Printed in the USA.

The SAS® System Executive Briefing... Coming Soon in Your Area

The free half-day SAS System Executive Briefing is designed for information management executives who need to integrate their computing environment from an applications point-of-view. Plan now to attend 1990 sessions in the following cities:

AK	Anchorage	July
AL	Birmingham	May
CA	Century City	June
	Irvine	Sept
	Los Angeles	Aug
	Pleasanton	June
	Sacramento	Sept
	San Diego	July
	San Francisco	July
CO	Denver	July
CT	Hartford	Aug
DE	Wilmington	June
FL	Miami	July
	St. Petersburg	Sept
	Tallahassee	May
GA	Atlanta	Aug
HI	Honolulu	May
IA	Cedar Falls	May
	Des Moines	Sept
IL	Chicago	June, July, Aug, Sept
IN	Indianapolis	May, Aug
LA	New Orleans	June
MA	Boston	Sept
	Springfield	May
MD	Baltimore	Aug
	Rockville	June, Sept
MI	Detroit	Sept
	Grand Rapids	June
MN	Minneapolis	June
MO	Kansas City	Aug
	St. Louis	May
MS	Jackson	June
NC	Cary	May, June, Aug
	Charlotte	Sept
	Greensboro	May
NE	Omaha	Sept
NH	Portsmouth	July
NJ	Edison	Aug
	Saddle Brook	May, July
NM	Albuquerque	Sept
	Los Alamos	Sept
NY	Buffalo	Aug
	New York	Sept
	Rochester	May
	Syracuse	July
OH	Cincinnati	Sept
	Cleveland	Aug
	Columbus	June
OK	Oklahoma City	July
	Tulsa	July
OR	Portland	May
PA	Harrisburg	May
	King of Prussia	July
	Pittsburgh	Sept
SC	Greenville	July
TN	Memphis	Aug
TX	Amarillo	June
	Dallas	May, Aug
	El Paso	Sept
	Ft. Worth	Aug
	Houston	May, Aug
	Lubbock	June
	San Antonio	July
VA	Norfolk	May
	Richmond	July
VT	Burlington	June
WA	Spokane	Aug
WI	Madison	June
	Milwaukee	May, Aug

Canada

Calgary	June
Edmonton	June
Montreal	Oct
Ottawa	Sept
Toronto	May, June, July, Aug, Sept
Vancouver	July

For registration information, mail the coupon at left. Or, call (919) 677-8200. In Canada, call (416) 443-9811.

I would like to attend a free SAS® System Executive Briefing.

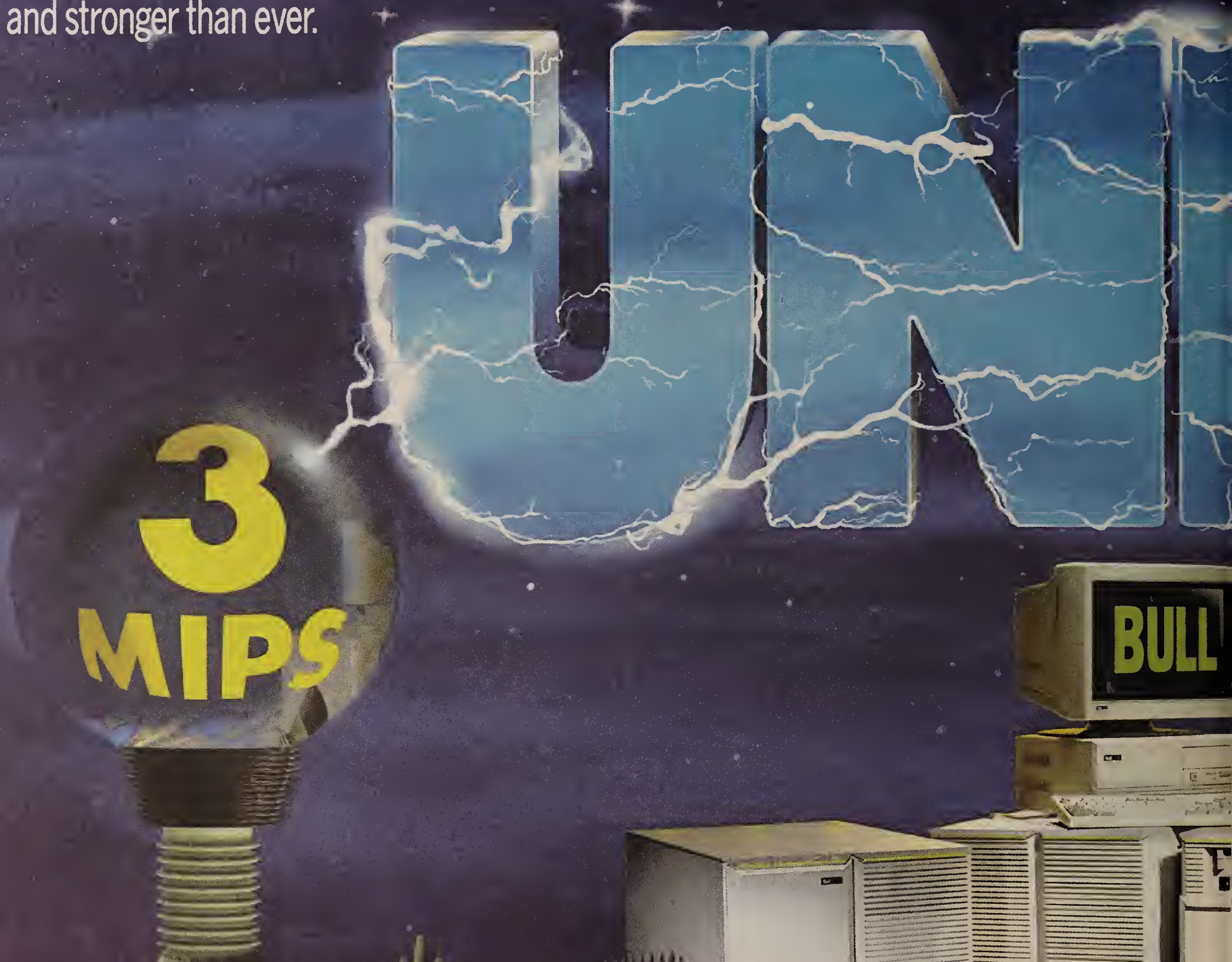
Please contact me with registration information for the Executive Briefing in (city) ________ in the month of ______
Name ________________ Title ________________
Company ________________
Mailing Address ________________
City ________________ State ______ ZIP ______
Telephone (____)________________
I will be using the SAS System on the following hardware: ________________
My specific applications needs include: ________________

Mail to: SAS Institute Inc., Attn: Executive Briefings SAS Circle ☐ Box 8000 Cary, NC 27512-8000

CW-6/18

SizeaBull

Four new UNIX systems make Bull's line longer and stronger than ever.



KNOW BULL

*UNIX is a registered trademark of AT&T. Oracle is a registered trademark of Oracle Corporation. Informix is a registered trademark of Informix Software, Inc. Uniplex is a registered trademark of Uniplex Integration Systems, Inc. Unify is a trademark of Unify Corporation. Copyright © Bull HN Information Systems Inc., 1990.

The DPX/2 Line

100 Family
200 Family
300 Family
500 Family

Featuring

Intel, Motorola and MIPS processing technologies

Bull Open Software environment; an enhancement of UNIX System V Major standards compliance (X-Open, IEEE, OSF, SVID)

Symmetrical multiprocessing

Open Architectures (AT, VME, Multibus II)

Outstanding capacity

- Connectivity to more than 500 users
- Storage to 40 Gigabytes
- Up to 576 MB Memory

Broad selection of industry solution products:

- RDBMS (Oracle, Informix, Unify)
- Telecommunications, Wide and Local Area (SNA, TCP/IP, OSI)
- Office (Uniplex)

Best price/performance of their class

One of the industry's best and broadest UNIX* lines is growing again.

Bull now provides unbeatable price/performance across a wide range of systems.

At the top end, Bull is introducing two of the most powerful multi-user systems based on Motorola's 68040 CISC and MIPS' R6000 RISC technologies. At the entry level the line has been extended with two new attractively-priced models.

Bull adds significant value through system level design and manufacturing; a wide variety of communication products; outstanding capacity; worldwide support, integration and services. Know Bull.

Learn more. Call 1-800-233-BULL x130 for a copy of the Bull DPX/2 Systems brochure.

Worldwide
Information
Systems

Bull

"If they can send a man to the moon, why can't they make my computers talk to each other?"

IBM Has Developed An Answer To The Looming Question Of Multivendor Networking.

As if getting people to work together weren't hard enough, you're faced with a somewhat more complex task.

Getting your computers to work together.

You see, computers, like people, need reliable connections to obtain, modify and distribute information.

And no other company connects more companies with more computers to more people than IBM.

Beyond physically connecting your computers, we help them to "interoperate" with each other.

This means that now, all your machines from different networks can speak the same language to each other. As a result, people can share all types of information: applications, files, resources, mail, anything. Whether it's across the hall, the country, or the globe.

Which is why we're committed to OSI solutions, to TCP/IP solutions and to SNA solutions: all to meet your open networking requirements for the '90s.

And IBM network management software will also help you better manage everything you've managed to network.

It's all part of IBM's commitment to helping all types of people using all types of computers work more productively together.

No matter how high their aspirations.

For more information, call your IBM Marketing Representative.

IBM®

© 1990 IBM Corporation.

MANAGER'S JOURNAL

EXECUTIVE TRACK

William N. Means was named to the newly created position of manager of information systems at **George Lithograph Co.**, a printing firm in San Francisco.

During the past 15 years, Means has held top executive positions in hospital organizations with responsibilities that included financial systems and IS.

He has been chief financial officer at French Hospital in San Francisco and Memorial Hospital in Gardena, Calif., as well as controller at Hospital Corp. of America in Nashville.

Means is a graduate of California State Polytechnic University and lives in Foster City, Calif.

……

Emile A. Bonneau has been named senior vice-president of operations at **Rhode Island Credit Union League** in Warwick, R.I., where his duties will include overseeing the league's computing operations.

Bonneau, who has more than 26 years of experience in the banking industry, was most recently a vice-president at People's Bank. He is the immediate past president of the Rhode Island Clearing House Association and chairman of the Rhode Island Bankers Association Operations Committee.

The Seekonk, Mass., resident is a graduate of the University of Rhode Island and holds an MBA from Bryant College in Smithfield, R.I.

……

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

IS gets its day in the Sun

Oil giant's systems people reap 'subtle but significant' benefits from decentralization

BY NELL MARGOLIS
CW STAFF

Ken Kauffman

Sun R&M's Pancione *(left) and Donohue aim to bring IS workers closer to the business problems they are helping to solve*

Sun Refining and Marketing Co.'s information systems department decentralized last year for the oldest and best reason in the world. "We had no choice," IS director Jack Donohue says.

Philadelphia-based Sun R&M is one of the several companies that make up Sun Company, Inc. At 105 years of age and with nearly $10 billion in revenue, Sun is one of the U.S.' venerable oil giants.

Today's energy companies tend to be short on complacency, big on change and death on anything that doesn't help the business. The energy company IS department that wants to survive and thrive, Donohue says, will do well to adopt similar priorities.

Last year, Sun R&M held a four-month, companywide brainstorming project called Sun Organizing For the Future. Business and IS management emerged from the project convinced that business systems and applications people had to start working directly in and for the business units they served.

"What we had to do for the business was demystify technology, get people to understand how it could be used for their benefit and then use it," says Donohue, a 23-year Sun veteran who has headed IS for seven years. "What we had to do for the systems people was get them closer to the business problems they were helping to solve."

While it is still early in the game, Donohue says, it appears that these goals are being achieved.

One goal that was not on the agenda was boosting IS people from second- to first-class citizenship in their company. However, roughly one year after the first IS folks left the parochial comfort of their department and set out for such relatively alien territories as Lubes, Fuels, Refining & Crude Oil and Finance, this is the bonanza they say they have reaped.

Mike Pancione became manager of fuels systems for Sun R&M's Fuels division, reporting directly to the vice-president in charge of that business unit. "Did I feel on the outside before?" Pancione says. "Yes, I did."

Although Pancione says he was not mistreated in any way while serving a Sun business from an IS base, he points out, "I wasn't necessarily a first-class citizen. I think that's true of every systems person who is not part of the business of The Business."

The advantage he now prizes was not one he saw coming, Pancione says. Before June 1989, as manager of systems for the Crude Oil group, he reported directly to Donohue and indirectly to the group's vice-president.

"When we first started discussing the possibility of a straight-line report [to a business head]," he says, "I felt that either way would be OK, that I wouldn't feel any difference."

The difference he found, Pancione says, "is subtle but significant. As a solid-line report to a business head, I'm sitting in budget meetings, merit meetings to decide who gets what bonuses — places I'd never been before."

Sun R&M finance manager Tom Fitzpatrick, who now reports to Sun Vice-President of Finance Peter Weitneight instead of to Donohue, agrees. "You're in the room when decisions are being made," he says. "Just being there is important."

One major reason why, Pancione says, is that mere presence soon trans-

Continued on page 74

Systems buyers agree: Reliability is a virtue

BY GARY H. ANTHES
CW STAFF

A panel of corporate computer systems buyers at the recent Adapso trade conference in Washington, D.C., agreed on at least two points — low prices do not necessarily win, and vendor reputation is of supreme importance.

Ray Lollar, vice-president of information services at Atlanta-based Gold Kist, Inc., said he relied heavily on credit ratings, analyst reports and customer references in choosing a vendor to provide hardware and software for a 106-store point-of-sale accounting and inventory control system.

He cited such virtues as staying power, reliability, dependability and responsiveness in choosing suppliers. Neither leading-edge technology nor low cost was a dominant factor, and Gold Kist rejected cheaper options in favor of a company that it said it thought would "remain in the business for the long run," Lollar said.

When Delta Air Lines needed an interactive audio response system for receiving telephone requests from pilots and flight attendants, it cited technical capability as the most important vendor criterion. After that, Delta sought financial strength, company reputation and track record, according to systems manager Harry Burnette.

Burnette said he carefully checked customer references supplied by vendors and was amazed to find that many gave poor accounts of the bidders' past performances. The vendor chosen was not the low bidder, he added.

Richard Elmore, vice-president of information systems at CBS Records International, also cited staying power as a key quality sought in bidders for a new artist royalty system. Two out of 10 bidders were rejected on the basis of reputation, he said. CBS chose Ernst & Young for the job, even though it had submitted a bid substantially higher than the lowest cost proposal.

"The essential message of all this is that there are no tricks, no shortcuts," Elmore said.

BOOK REVIEW

To Dad, with love: Watson Jr.'s Big Blue autobiography

FATHER, SON & CO.
By Thomas Watson Jr.
Bantam Books, $22.95

It may be hard to imagine for longtime industry pros, but the current generation of computer professionals hardly equates the name Watson with IBM. It has been, after all, 20 years since Thomas Watson Jr. stepped aside as chairman of IBM, marking the end of nearly 60 years of Watson reign at the industry's preeminent company.

To those who remember, however, the name Watson was synonymous with Big Blue. T.J. Watson Sr., the autocratic but benevolent entrepreneur, laid the foundation and built the structure for what became the modern IBM. His son Tom took the company into computers and spearheaded its record-breaking growth.

Now, Watson Jr. has decided to tell his story. It took nearly a decade of persuading by friends and publishing heavyweights, but in *Father, Son & Co.,* Watson pours out a shockingly candid view of his tempestuous relationship with his father and the great weight that IBM became for him. The book is receiving mixed reviews in the business and general press, but make no mistake: This is a must read.

The book offers an intriguing look inside one of the best known father/son business relationships in history, while at the same time providing a high-level view of the company heretofore missing from the myriad IBM corporate biographies.

True, the book is flawed: It is too long, many of the key IBM stories are a bit sanitized, and Watson's tales of yachting trips, ski houses and his decidedly upper-crust reality can be a turnoff.

Even so, the book is an engaging read, told in a straightforward first-person voice that offers no apologies; it just plows head-on into one of the strangest personal/business relationships ever told.

From the outset, Watson paints a picture of a father/son relationship that could serve as the prototype for a good Freudian analysis. Watson Sr. was the classic rags-to-riches, Horatio Alger type, a quintessential salesman who built his business on a deep belief in people and structure. He believed in company songs, mottos and loyalty. He kept his hand in every aspect of the business, traveling endlessly to meetings, dinners and functions to see and be seen by the IBM masses.

When a train carrying IBM families to a company function in New York crashed upstate, Watson Sr. climbed out of bed at 2 a.m. and drove all night to the scene. He ordered in extra medical care, paid for everyone's expenses and spent the next day in the hospital with the injured.

The senior Watson's generosity was matched by an obsessive eye for detail and an enormous ego. His picture hung in every IBM office in the land. He became personal buddies with the likes of Franklin D. Roosevelt and succeeded in becoming bigger than the company he ran.

For his oldest son, Dad's success was a haunting and heavy burden. Born into wealth and privilege, young Watson simply had no way to copy his father's feats. Yet he felt compelled to confront and conquer this daunting demigod from early on.

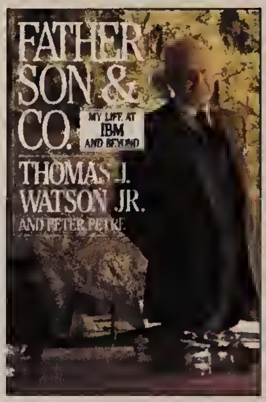
The relationship Watson describes is at times bizarre. For example, he describes endless, intense fights with his father, fights that would leave both men in tears and emotionally shattered. But immediately, a simple note pledging admiration and love would patch the wound and allow the pair to struggle forward to the next explosion.

In a recent interview with *Computerworld,* Watson said he intended this book to be a "love story." If so, it is a painful love story indeed.

Watson gives himself no quarter. He is terrifically hard on himself throughout the book and often portrays himself as a spoiled, temperamental brat who felt bad but would still use his father's influence whenever it was needed.

For example, as a young IBM salesman in 1940, he was handed a major account by his father and achieved his yearly quota on the first business day of the year. Rather than demand equal treatment, Watson says simply, "I was demeaned."

When the elder Watson died in 1956 at 82, Watson Jr. was thrust into the lonely role of running IBM. Here he paints a vivid picture of the insecurity of taking over one of the major corporations in the U.S. Ironically, Watson shines here, but you wouldn't know it from the tenor of his words. His self-doubt pervades the entire book.



Nonetheless, Watson forcefully led IBM out of the punch-card era and into computers. He built the company from less than $500 million in revenue to a $7.5 billion behemoth, along the way reorganizing and restructuring with such innovation that IBM became the classic business-school case study of how to run a company.

Watson doles out the credit generously to Al Williams, Vin Learson and other key executives, but it is clear that he learned his father's lessons well. In the midst of tremendous growth, he managed to maintain IBM's people-first environment. He instituted, for example, innovative and generous benefits, stock options and retirement packages for the work force.

Perhaps the most interesting section for IS readers is the development of the System/360. "It was the biggest, riskiest decision I ever made," he says about pushing the 360 product announcement up far in advance of the time the machine would be ready. When the system was introduced on April 7, 1964, some of the equipment included wood mock-ups. Though the entire development process put all of IBM through an intensely emotional wringer, the resulting computer changed the industry and brought in billions for IBM.

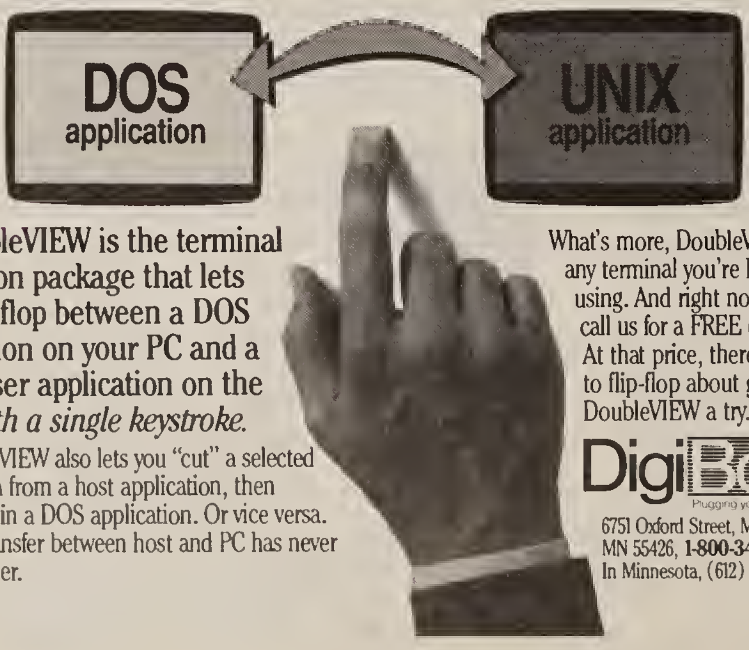
A heart attack in 1970 caused Watson to retire at age 56. He describes, in too much detail, his sailing adventures and his short, troubled career as U.S. ambassador to the Soviet Union under President Carter. However, he also weaves in his coming to terms with his father in his later years, a sadly touching revelation.

Watson has clearly mellowed since his halcyon days at IBM. He took up helicopters at age 62 and claims to still be buzzing solo around the New York area in his whirlybird today. A robust 76, Watson hobnobs with the likes of Soviet President Gorbachev and the nation's Who's Who. His book immediately jumped onto *The New York Times* bestseller list, which proves that despite a decade out of the limelight, Watson is still an intriguing subject to a lot of people. After reading this book, one must wonder what kind of book Tom Sr. would have penned.

GLENN RIFKIN

Rifkin is a *Computerworld* features editor.

Flip Flop, Flip Flop, Flip Flop.



DoubleVIEW is the terminal emulation package that lets you flip-flop between a DOS application on your PC and a multi-user application on the host *with a single keystroke.*

DoubleVIEW also lets you "cut" a selected screen area from a host application, then "paste" it in a DOS application. Or vice versa. And file transfer between host and PC has never been simpler.

What's more, DoubleVIEW emulates any terminal you're likely to be using. And right now, you can call us for a FREE evaluation copy. At that price, there's no need to flip-flop about giving DoubleVIEW a try.

DigiBoard
Plugging you into tomorrow
6751 Oxford Street, Minneapolis, MN 55426, **1-800-344-4273.**
In Minnesota, (612) 922-8055

Insurance firms lag behind

BY ALAN J. RYAN
CW STAFF

ATLANTA — The insurance industry, on the whole, has not yet begun to tap the wealth of management and planning resources available through the effective use of information technology.

Those were the findings of a study released earlier this month by Cambridge, Mass., consultancy Arthur D. Little, Inc. on behalf of LOMA (Life Office Management Association), an Atlanta-based insurance industry research, education and information provider.

The results did not come as a surprise to Laurence P. Chait, director and manager of Arthur D. Little's information systems planning practice, who authored the report and managed the team that conducted the study.

The study, called "Information Technology: Achieving the Potential," showed that although some companies are making gains using technology, there is a general failure to get complete benefits industrywide, Chait said.

"That doesn't mean they don't use technology or that the systems don't work, because they do," Chait said. "But if you compare what they might get compared with what they do get, there is a significant gap."

The study consisted of both one-on-one and group interviews with more than 150 IS managers and other senior executives across the insurance industry.

Chait acknowledged that companies can never achieve the full potential of information, because the potential is a moving target. "It keeps growing faster than our companies can assimilate technology's advances and capitalize on them," he wrote in the study.

In the insurance industry in particular, Chait said, many technology applications "simply automate tasks — fill in the blanks on a claim form faster, for example. Forms are created faster, but then the printed form still moves from one desk to the next."

The report suggested that senior managers use the following four processes to better achieve the potential of today's information technology:

- Understand the technology.

LOMA Arthur D Little

- Develop an explicit role for information technology within your vision of the organization.
- Communicate your vision and expectations throughout the organization.
- Be involved in information technology planning and management, participating directly and monitoring performance.

Line managers must then follow by having the responsibility of integrating the technology into the fabric of the work they manage, according to Chait.

"Line managers must learn to conceive of information as an asset to exploit, and they must view information technology as capital in which to invest aggressively," he said.

The information technology professional in all of this must play a pivotal role — moving away from the data center and moving toward strategic business involvement. The IS manager must ensure that support organizations can implement senior executives' visions, establish a group to watch and assimilate new technologies and become directly involved in corporate strategic planning.

Maintain
Laptop to Mainframe Translator Main-FIX
STROKE
The 3270 Keystroke Emulator
ware
ade
asy

Given Enough Time And Money You Could Turn A PC Laptop Into A 3270 Terminal.

Like Ours!

You have better things to do with your time and money than reinvent the wheel. Or rather, reinvent the Informer Model 213PT.

Only the Informer 213PT combines the dual functionality of a 3270-compatible processing terminal and a DOS-based 386SX PC in one sleek, lightweight package. Complete with a 3270 style keyboard with all the function keys needed for on-line application processing.

Emulating a 3274 controller with two attached 3178 display stations, the 213PT accesses host-based 3270 databases and applications via its integral V.32 9600-baud modem.

Operating as a PC with DOS 3.3+ in ROM, up to 4 megabytes of on-board memory and up to 4 megabytes of silicon-disk storage, the battery-backed 213PT accepts and executes any DOS application directly from the host computer.

Whether using the 213PT for dial-in networking or portable application processing (they're only one keystroke apart), the flat screen EGA electroluminescent screen adds easy-to-read to the 213PT's other benefits of high performance, connectivity, ease-of-use and enhanced security.

Sure, given enough time and money you could do anything for yourself. For instance, why not take a little time right now and call for more information about the Informer Model 213PT. It won't cost you a cent.

INFORMER
COMPUTER TERMINALS
THE DIAL-UP COMMUNICATIONS COMPANY
12781 Pala Drive, Garden Grove, CA 92641-3923
(714) 891-1112, FAX: (714) 898-2624

Sun

FROM PAGE 71

lates into not-so-mere power. For the first time in his 13 years at Sun, he says, "I get to have an impact on the way people act who are not computer people. I'm treated as an equal. It's becoming easier to do my job."

The importance of being there has not been lost on Donohue, who is widely credited as one of the major forces behind the decentralization of his own department.

"Ownership makes a big difference," he says. "I think you're just talking about human nature."

Unlike some observers of the IS community, Donohue does not believe that corporate IS will come of age only when the IS director is looked upon as a potential chief executive officer. However, he says, "The IS director does have to be a general manager and be recognized as such within the company. Being part of the corporate planning team is a powerful position. Being there is the next stage for us."

Donohue says he believes that the wall between systems and corporate will not really be torn down until crossovers occur in both directions.

"Somewhere down the pike, I hope to see not just systems people in the businesses, but business people in systems," he says. The harder it is to tell who's what, he adds, the easier it is to do what's needed to fuel the company.

It is especially important, both Pancione and Donohue say, to soften the lines between traditional IS and corporate as the distinctions between the day-to-day necessities of such age-old divisions are vanishing.

"The oil flows across the company," Donohue says. "There are real business reasons for integrating the way we are."

The bottom line for Sun's IS, and ultimately for the whole company, is the criticality of information — and the need for dispersal of the talent and ability to deal with it.

"Hardly anyone at this company ever sees a barrel of oil," Pancione says. "Everything is on a computer screen somewhere."

The blurrier the better

Sun R&M's IS director, Jack Donohue, would like to see the distinctions between information systems people and business folks dim even further than they already have. The more they do, he believes, the better things will run. And the day Donohue can tick this item off his wish list may not be that far down the road.

In the Fuels division, new manager Mike Pancione is hoping to stage a trial run within the next several months. One of the systems people has been working closely with one of the users in fuels. When the user takes a vacation later this summer, Pancione says, he may move the systems person into the user's job.

"How much damage can you do in a week?" he says. If the answer turns out to be as he suspects — none, but you can do a lot of good — Sun can expect to see more such switches.

"People get trapped in their day-to-day jobs and end up not seeing the big picture very well," Pancione says. "It's important to blur the lines."

NELL MARGOLIS

Services demand to grow

BY SALLY CUSACK
CW STAFF

The demand for systems operations services, including outsourcing of facilities management, will grow from a $5.9 billion market in 1989 to $12.8 billion by 1994, according to a recent study by Input, Inc., a research and consulting firm in Mountain View, Calif.

Input broke the market into two categories: processing and professional services.

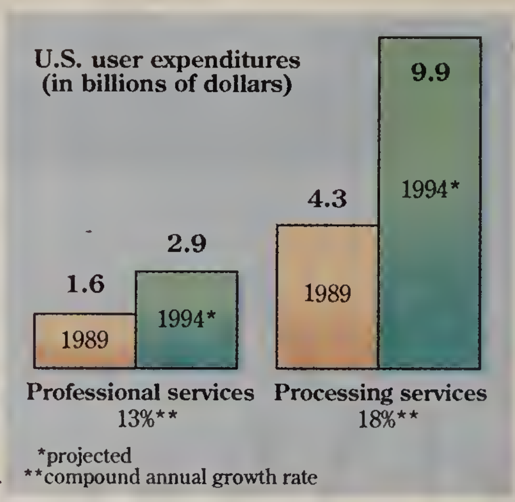
Under the processing services mode, the vendor provides all planning, management and operations services for the client — using vendor-owned equipment. Doug Wilder, manager of systems integration at Input, said this mode of operations is growing at a compound annual rate of 18% and is most prevalent in the commercial sector.

With a compound annual growth rate of 13%, professional services — in which vendor-provided personnel plan, manage and operate client-owned equipment — is most popular in the federal government market, the report said. "The government prefers to own its own equipment, but the commercial markets want to offload the investment," Wilder said.

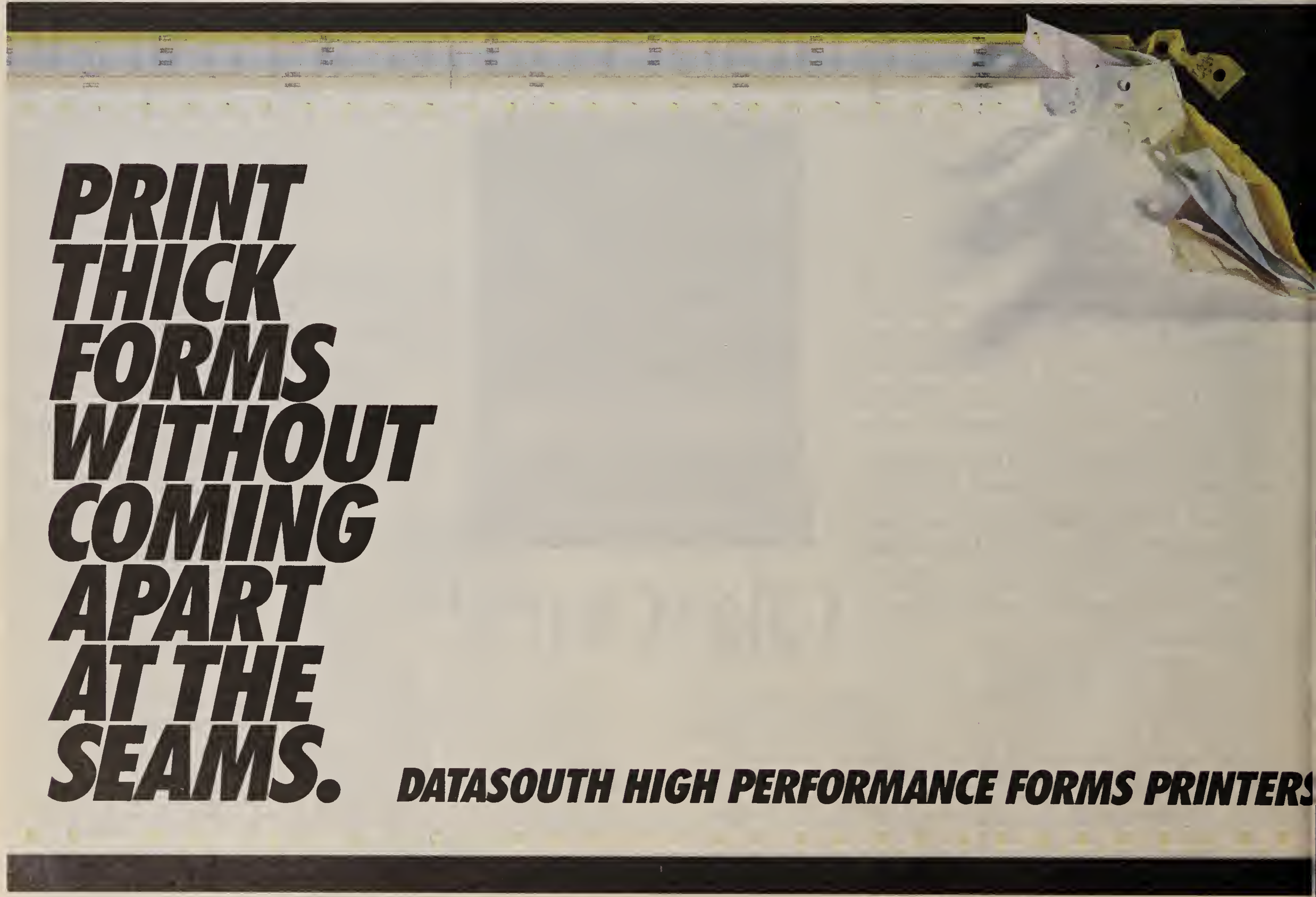
The report also indicated that the growing need for systems integration services is fueling the move toward outsourcing by establishing confidence in long-term contracts.

Boom time

Demand for systems integration and outsourcing is fueling growth in IS services



Source: Input, Inc. CW Chart: Paul Mock


PRINT THICK FORMS WITHOUT COMING APART AT THE SEAMS.
DATASOUTH HIGH PERFORMANCE FORMS PRINTERS

TAKING CHARGE

Alan J. Ryan

Too slim to be believed?

A memorable cartoon I once saw had the caption, "I've been wearing a 34-inch waist since high school." The sketch shows an older gentleman wearing his trousers hiked up to just under his armpits and bragging to a friend; meanwhile, his bulging 50-inch waistline is putting the pleats of his pants to a serious stress test.

That cartoon reminds me of some information systems organizations that claim to be, in their terms, "moving toward a flatter organization by eliminating the hierarchical management pyramid."

What they are saying, of course, is that they are trying to eliminate some of the middle layers of management. But until I really see it happening, I'll still assume that though they claim to be flatter, they are actually girdling a 50-inch waist into a 34-inch waistband.

We've all heard the claims of the parent companies that say the term "layoff" is banned from their corporate vocabularies. I hate to be an instigator, but why is it that flattening companies that don't have layoffs seem to experience a rapid rise in attrition?

Am I the only one who has noticed that the same IS chiefs who just a few years back would boast of having only a 5% rate of attrition in their shops now use phrases like, "Through attrition, we were able to eliminate eight midlevel managers over four months"?

And if the attrition rate does not rise, then couldn't one assume that it may conceivably take years to achieve a flatter organization? If that is the case, perhaps companies will learn to get a little more creative to bring about the flat organization they claim they desire.

For instance, IS shops may take all of the midlevel managers aside, issue new business cards and call them all consultants. What a coup! A layer of management has vanished on paper, the organization is flatter as far as the cataracted eye can see, and the company still retains all of the people who can provide that midlevel management point of view.

Some workers are offered their walking shoes in the form of "early retirement." If the word does not get out that their chances of being hired are slim in these days of flatter organizations, they might actually grab the golden parachute and fly. At least they will be out of your hair.

A third alternative is to spin off divisions and/or groups at the rate of one or two per month — thereby creating a home and an important-sounding title for a midlevel manager without having to hike salary levels.

An assistant director of systems development might become vice-president of systems development for the corporate headquarters staff; a programming team leader might become "senior vice-president of Cobol programming," and a director of PC training might become "vice-president/training, corporate systems group."

So, keep hiking those trousers up. No one will notice, really.

Ryan is a *Computerworld* senior writer.

MANAGEMENT BRIEFS

ASM lines up new 1990-91 slate of officers

The **Association for Systems Management** (ASM) has announced its slate of international officers for the 1990-91 year.

Newly elected officials of the association, which represents 8,000 information systems managers, analysts and consultants internationally, were installed earlier this month. President Scott J. Beltz, manager of Extended Systems, Inc., in Boise, Idaho, is president of the Idaho Intermountain chapter of ASM. President-elect is Paul R. Saunders of the Nashville chapter. He is also president of Saunders Systems Corp. in Nashville.

Vice-president is Linda J. Menard-Watt of the Sun Parlour chapter, who is manager of administration information systems at the University of Windsor in Windsor, Ontario. Treasurer is William D. Munch of the East Bay chapter. He is an IS consultant in Pleasant Hills, Calif.

The new secretary is Ross A. Flaherty of the Fort Worth chapter. Flaherty is director of information resources management and the Microcomputer Resource Center at Texas Wesleyan University in Fort Worth.

Nominations are due by Aug. 1 for the **Professionalism in Service Management Award**, presented by AFSM International in conjunction with the Data Group.

Winners of the award, which was created in 1986 to honor service managers whose professional and personal activities have "done the most to increase the professional image of managers in the high-technology services industry," will be notified by Sept. 15. The award will be presented at the 16th AFSM International World Conference to be held Sept. 30 to Oct. 3 in Rosemont, Ill.

For more information and nomination forms, contact AFSM International in Fort Myers, Fla., (800) 333-9786.

If your printer leaves your nerves as ragged as your multipart forms, then it's time to retire — the printer, that is. And pick up a Datasouth printer instead.

Only Datasouth printers are designed to go easy on you and your multipart forms. They're built to withstand grueling 100% duty cycles for years of trouble-free printing, even on your most troublesome forms.

Datasouth printers are packed with a multitude of solid features. Like a straight paper path to eliminate bunching and jamming. A high powered ballistic printhead to print legibly through forms up to six copies thick. A range of speeds from 180 to 400 cps. Even a zero tear-off feature for demand document applications.

And Datasouth printers are plug compatible with your standard hardware: ASCII minis and micros, DEC VAX systems, or IBM System/3X, AS/400, or 3270-type systems.

So before you and your forms go to pieces again, get rid of your old printer. And get your act together with a Datasouth. Call **1-800-476-2120** for the name of your nearest dealer.

© 1990 Datasouth Computer Corporation. DEC is a registered trademark of Digital Equipment Corporation. IBM System/3X, and AS/400 are trademarks or registered trademarks of International Business Machines Corporation.

Datasouth

AMERICA'S HIGH PERFORMANCE PRINTER COMPANY

Please send me more information on the printers that keep my forms in one piece.

NAME

TITLE

COMPANY

STREET ADDRESS

CITY/STATE/ZIP

( )

PHONE

Mail to: Datasouth Computer Corporation
P.O. Box 240947, Charlotte, NC 28224

CW 6 18/90

CALENDAR

Consulting skills, communicating effectively with information systems clients, leadership, end-user computer support and marketing the IS organization internally are some of the topics that will be covered at the 5th annual Ouellette & Associates Summer Workshops to be held Aug. 20-23 in Nashua, N.H.

The theme of the conference will be "Developing the Human Side of Technology." NBC News correspondent Irving R. Levine will be the keynote speaker. For more information, contact Ouellette & Associates at (603) 623-7373.

JULY 8-14

Information Center Conference and Exposition. San Francisco, July 8-12 — Contact: Weingarten Publications, Boston, Mass. (617) 542-0146.

American Production and Inventory Control Society Seminar and Exhibition. San Francisco, July 9-11 — Contact: APICS, Falls Church, Va. (710) 237-8344.

Software Engineering Strategies Conference. Vancouver, B.C., July 9-11 — Contact: Ashley Pearce, Gartner Group, Stamford, Conn. (203) 967-6757.

Navy Micro '90 Conference. San Diego, July 9-12 — Contact: Nardac, San Diego, Calif. (619) 545-8645.

Consulting Skills for the Information Processing Professional. Los Angeles, July 10-11 — Contact: Ouellette & Associates, Bedford, N.H. (603) 623-7373.

Information Networking: Technologies & Applications. Washington, D.C., July 10-12 — Contact: Ms. Schoen, Bell Atlantic Educational Services, Princeton, N.J. (800) 327-8412.

Service and Quality: Transforming the Vision into Reality. St. Louis, July 11-13 — Contact: Donna Skaggs, Washington University, St. Louis, Mo. (314) 889-4556.

JULY 15-21

Association of College and University Telecommunications Administrators Annual Conference and Exhibit. Orlando, Fla., July 15-19 — Contact: Lisa McLemore, ACUTA, Lexington, Ky. (606) 252-2882.

Managing Quality Function Deployment. Dallas, July 16-17 — Contact: Technology Training, Torrance, Calif. (213) 534-3922.

EDI in the International Marketplace. San Francisco, July 16-18 — Contact: International Congress Registrar, Alexandria, Va. (703) 838-8042.

Engineering Workstatians Conference. Boston, July 16-18 — Contact: EWC, Santa Monica, Calif. (213) 450-0500.

Industrial and Engineering Applications of Artificial Intelligence and Expert Systems. Charleston, S.C., July 16-19 — Contact: Dr. Moonis Ali, University of Tennessee Space Institute, Tullahoma, Tenn. (615) 455-0631.

Telephone Network Overview. Cincinnati, July 17-18 — Contact: CBIS Network Technologies, Cincinnati, Ohio (800) 543-4477.

Database World Conference & Exposition. Santa Clara, Calif., July 17-19 — Contact: Digital Consulting, Andover, Mass. (508) 470-3870.

Macintosh/New York Conference & Exposition. New York, July 17-19 — Contact: Exposition Management, Waltham, Mass. (617) 290-0400.

Developing Procedures, Policies and Documentation. Houston, July 17-20 — Contact: Information Mapping, Seminar Division, Waltham, Mass. (617) 890-7003.

Multivendor Networking: Linking PCs, Minis and Mainframes over Local- and Wide-Area Networks. San Francisco, July 17-20 — Contact: Learning Tree International, Los Angeles, Calif. (800) 421-8166.

SNA Gateways: An In-Depth Examination. Santa Clara, Calif., July 18-20 — Contact: J2 Software Labs, Santa Cruz, Calif. (408) 292-6300.

Sun User Group Western Regional Conference. Sunnyvale, Calif., July 19-20 — Contact: Joanne Lee, SUG, Palo Alto, Calif. (415) 336-0564.

JULY 22-28

North American Conference of International Business Schools Computer Users Group Meeting. Omaha, July 22-25 — Contact: Sufi Nazem, College of Business Administration, University of Nebraska, Omaha, Neb. (402) 554-2816.

GUIDE 77 Convention of Midsize and Large-Scale IBM Systems Users Group. Chicago, July 22-27 — Contact: Guide International, Chicago, Ill. (312) 644-6610.

The CAMMP Show for Computer-Aided Graphics, Multimedia and Presentations. Chicago, July 23-27 — Contact: Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

Multi-Net Expo '90. Houston, July 25-26 — Contact: Ann Garner, Multi-Net Expo, Houston, Texas (713) 827-8030.

Utah State University IT Institute. Logan, Utah, July 25-28 — Contact: Monique Squire, Logan, Utah (801) 750-1690.

Knowledge Acquisition & Engineering Conference. Cambridge, Mass., July 26-27 — Contact: International Business Communications, South Natick, Mass. (508) 650-4700.

Marketing the IS Organization Internally. Chicago, July 26-27 — Contact: Ouellette & Associates, Bedford, N.H. (603) 623-7373.

JULY 29-AUGUST 4

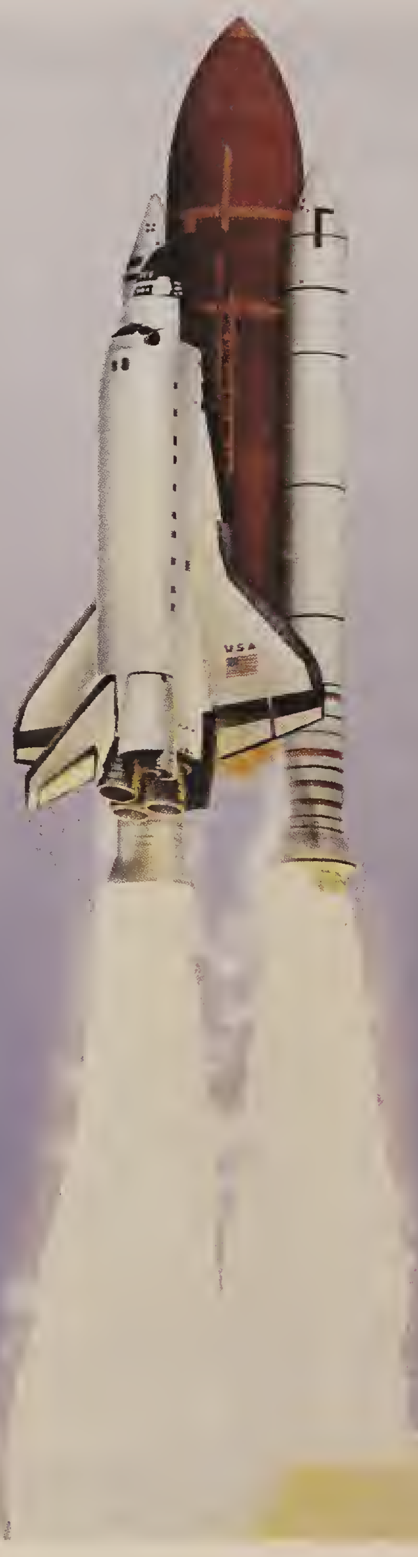
AI-1990 Conference. Boston, July 29-Aug. 3 — Contact: American Association for Artificial Intelligence, Menlo Park, Calif. (415) 328-3123.

Insourcing vs. Outsourcing: The Summit Meeting. Atlantic City, July 31-Aug. 1 — Contact: The Yankee Group, Boston, Mass. (617) 367-1000.

Computer Security in the '90s Conference and Exposition. Atlanta, Aug. 1-3 — Contact: Inforum, Atlanta, Ga. (800) 343-5048.

Software Measurement and Estimation Seminar. Boston, Aug. 2-3 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

Troubleshooting, Maintaining & Upgrading PCs Seminar. San Antonio, Aug. 2-3 — Contact: Quest, Spotswood, N.J. (201) 251-3217.



DB2™

PRODUCTIVITY
PERFORMANCE
...PARITY™ DBSS

Within
The Edit Session:

Functions
- Builds, tunes, tests and times SQL
- Provides an interactive tuning guide
- Hosts a complete on-line tutorial
- Standardizes SQL
- Delivers a comprehensive plan analysis

Features
- Contains an Artificial Intelligence System, providing extensive SQL performance analysis
- Supports all languages, QMF and SPUFI
- Analyzes and tests SQL from code generators and 4GLs
- Operates as primary ISPF commands

Benefits
- Cuts development costs by 20% or more
- Tunes, tests and times SQL before the first pre-compile
- Minimizes programmer demands on DBAs' time
- Reduces CPU cost
- Requires no special education
- Promotes programmer awareness of efficient SQL

Try PARITY on a 60 day free trial basis.
Call today to arrange an on-site demonstration.

Paragon Software International
One North Plaza
P.O. Box 345
Bogota, N. J. 07603
(201) 641-8203 • 1-800-462-5582

PARITY™ DBSS | THE DEVELOPMENT PARTNER .... for DB2

CHARTER VENDOR MEMBER
INTERNATIONAL DB2 USERS GROUP

© 1990 Paragon Software International

AT&T announces striking savings on an unmatched digital service.

Did you know that in 1989, AT&T slashed prices of its ACCUNET® Switched Digital Services (SDS) by up to 74%? When you consider that AT&T is the only vendor that can offer your business the advantages of a public switched digital service, that figure is doubly impressive.

For one thing, SDS has access to over 500 cities, more than any other vendor. So with us, you get the capability to transmit data wherever you want it to go. Even France, Jamaica, Japan, and the U.K.

You also get access to applications like video teleconferencing, Group IV facsimile and bulk data transfer.

And another very valuable feature. SDS is easy to use.

Savings on this remarkable service aren't limited to the 1989 price reductions, either. So far this year, evening and night/weekend rates have been lowered by up to 28%. Further, because SDS is an on-demand service, you only pay for what you use.

So if you want the quality, reliability and flexibility of a private line, without the expense, pick up ACCUNET Switched Digital Service at our new prices.

ACCUNET Switched Digital Services.
Another AT&T advantage.

For more information, contact your AT&T Account Executive or call 1 800 222-0400.

AT&T
The right choice.

© 1990 AT&T

Sharing a strong family resemblance can be a curse.

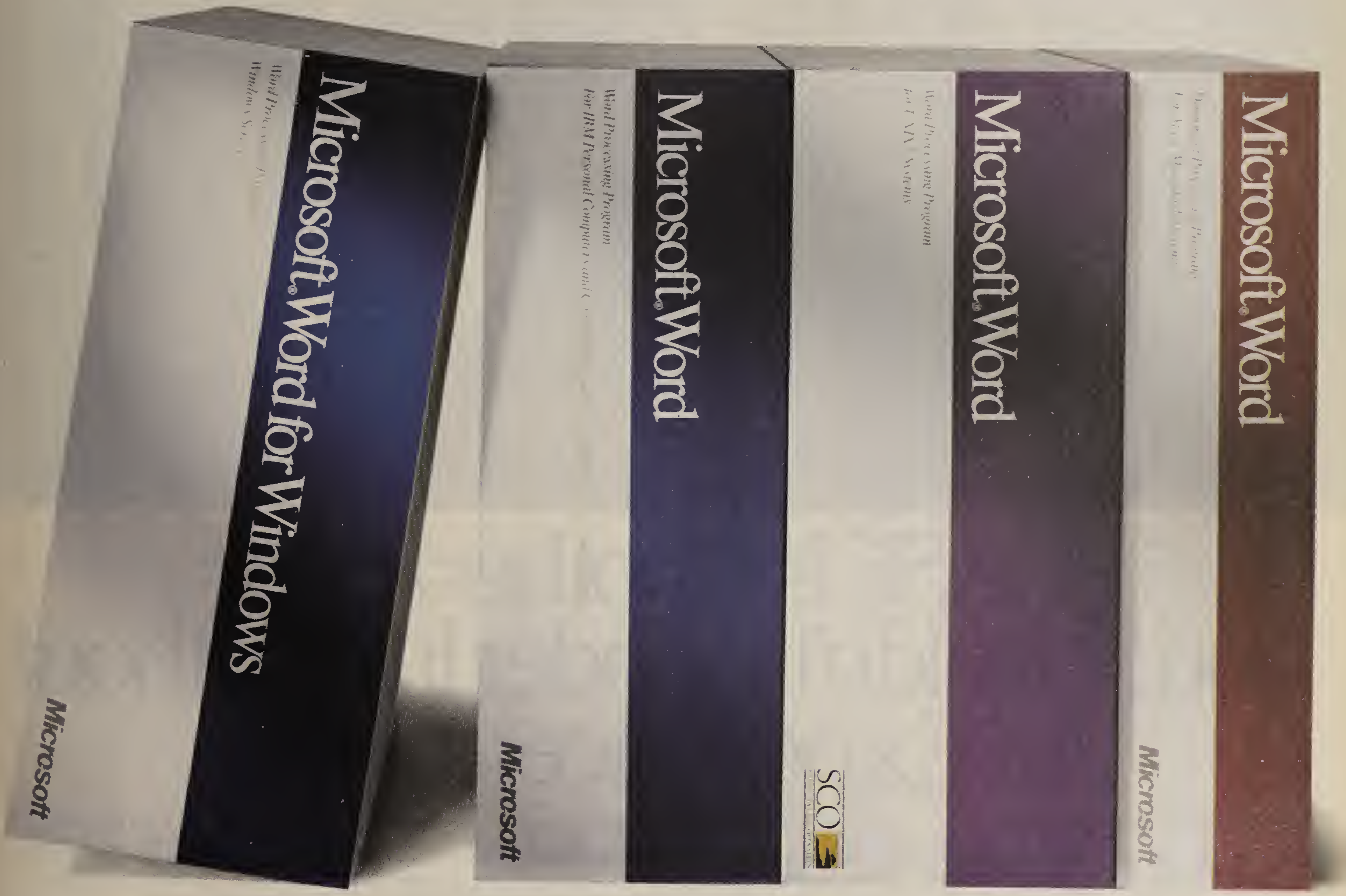
We don't know about your family, but members of the Microsoft® word processing family share some rather attractive characteristics.

Simply put, they work alike. Every Word program comes with a complete set of high-end features that are not only consistently implemented, but consistently easy to use. So by standardizing with us, your users are assured of outstanding performance on every platform. We've even developed an OS/2 version, which is due to ship shortly.

Furthermore, you won't find any sibling rivalries within the Word family. They read and write to one another, as well as applications from other software companies. Which makes file

Customers inside the 50 United States, call (800) 541-1261, Dept. K97. In Canada, call (416) 673-7638. Outside the U.S. and Canada, call (206) 882-8661. © 1990 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks and Making it all make sense is a trademark of Microsoft Corporation.

Or a blessing.



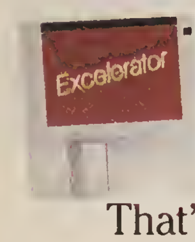
sharing a possibility. And increased productivity a reality. Other shared traits include styles, glossary and outlining features. So you can establish consistent standards throughout your entire corporation.

Of course, adopting our family also benefits you. Training will require less of your time. And transitioning users from one hardware platform to another will be much easier, too.

For a free white paper on word processing, call (800) 541-1261 and ask for Department K97. As far as families go, it wouldn't hurt to look at ours.

Microsoft
Making it all make sense

CASE Is Another Area You Shouldn't Wander Into Without An Experienced Guide.



More than one IS manager has gotten lost in the labyrinth of CASE implementation.

That's why you need Index Technology—the world's most experienced CASE provider—to show you the way. As the developers of the Excelerator® Series, we've helped tens of thousands of users around the world map out successful CASE solutions.

What makes us different from the other CASE companies? Simple. At Index Technology, we don't just sell you a lot of flashy technology and then leave you in the dark.

Instead, we give you everything you need to make your CASE effort succeed—including proven technology, adaptable products, and an array of support services rated the best in the business. We show you how to get results, then stay by your side to make sure that you do.

Over the years, that total-solution approach has earned us the trust of our customers. Including IBM, our biggest customer of all. In fact, IBM has so much confidence in us, it's purchasing an additional 2250 copies of our Excelerator products for its own use worldwide.

So it's no wonder that IBM is marketing our Excelerator Series as part of its own AD/Cycle™ offering. Or that IBM is relying on our advice in designing the Repository's information model. Which means our customers never have to worry where their CASE investment will lead.

The fact is, we have so much faith in our CASE solution, we encourage 60-day product trials. We're the only CASE vendor who does. We think that says a lot about us—and even more about our competition.

But don't take our word for it. Call us for details on actual CASE success stories, and find out what our customers have to say. Then try the same thing with our competitors.

IBM Business Partner

Once you do, we think you'll agree: It's safer going into CASE with someone who's been there many times before.

Index Technology Corporation,
One Main Street, Cambridge, MA
02142, 1-800-777-8858.

Index Technology

There's No Substitute For Experience.

Excelerator is a registered trademark of Index Technology Corporation. IBM is a registered trademark and AD/Cycle is a trademark of International Business Machines Corporation.

PRODUCT SPOTLIGHT

HIGH-PERFORMANCE PCS

Not everyone is out to set a speed record

BY ALAN RADDING

Many people hear about the power of an Intel Corp. I486-based personal computer and ask "why?" For others, the response is closer to a "why not?" or even "how much?"

A lot of corporate buyers view the 486 as merely a much faster version of the Intel 80386-based machine. Whereas the 386 took desktop computing from 16- to 32-bit capabilities, the 486 is very similar in architecture to its predecessor. It uses the same basic instruction set as the 386, but it outperforms the 386 and delivers better price/performance through the physical integration of the math coprocessor and cache on the same chip as the CPU. According to some figures, a 25-MHz 486 performs two to four times faster than a 33-MHz 386, depending on the application and a number of systems design and implementation features.

Speed issues get more yawns than praise from many corporate microcomputer managers — at least until there is software and an operating system that can take advantage of its power.

"Last year, people wanted to talk about the differences between the 286 and the 386. But with the 486, there's nothing [new] to discuss," says Roger Bender, vice-president of Citibank NA's investment banking division in New York and president of the New York Micromanagers Association.

In addition, these managers ask, who needs all that power?

The "why-not" segment of the market may be inclined to agree that it doesn't need the power today, but these managers figure that the 486 will come in handy for future needs.

Ed Bussean is a member of this group. At Commonwealth Edison's LaSalle County Station, a nuclear power plant just outside of Marseilles, Ill., Bussean is building his company's first PC network. For the server component, he is evaluating several 486-based PCs, including one from AST Research, Inc.

"A 386 would probably do the job, but I don't know anybody who ever bought too much computer," says Bussean, PC administrator at the firm. "We may not [take full advantage of] the 486 today, but a year or two years from now . . . well, these things always snowball."

Speed demons

The real enthusiasts — those excited about the new speed threshold — are people frustrated with DOS applications that run slowly even on high-end 386s. These buyers are using the machines as supercharged 286s and 386s and finding them handy for large databases.

Steve Geier, associate director in the finance department at New York Telephone, couldn't wait to see how the 486 would handle his very large financial modeling application that ran on a 200M-byte database. Formerly a Compaq Computer Corp. and AST user, Geier shopped around for a low-price computer and settled on a machine from Digital Distributing, a vendor that was just entering the market.

When Geier saw runtime decrease from 33 to 21 hours, he ordered two more 486s for other large financial models.

At Wilson Jones Co., a Chicago-based office products marketer, Richard Lange knew he wanted a 486 machine to take sales data from the mainframe and create tables and reports for marketing personnel. Although the company is traditionally IBM-oriented, Lange chose a Compaq Deskpro 486 for its performance capability and reduced the application's runtime from 1½ days to a few hours. "Everyone is hungry to get the information as quickly as possible," says Lange, an information systems manager at the company.

Computer-aided design users who have 4M- and 5M-byte files don't give the 486 decision a second thought. Wilsey Ham Pacific, an engineering firm based in Bellevue, Wash., has already purchased three Hewlett-Packard Co. 25-MHz Vectra 486 machines. Wilsey Ham still relies mainly on its 25-MHz 386s, also from HP, but it creates its larger Autocad drawings on the 486s.

"The size of our drawings keeps getting larger, so we wanted the fastest thing we could get," says Mike Gibbons, a computer systems manager.

"We're using a 33-MHz 386 PC now, but we've ordered a 486," says Nolan Walker, managing director at Varitech in Beaumont, Texas, a subsidiary of Gulf States Utilities. "I don't know what the difference will be yet, but I want to find out."

Far to go

However, while the power-hungry are buying 486-based machines, these PCs are far from becoming a corporate standard.

Compared with Intel's 286, 386 and even 8088 and 8086 PCs, the 486 will lag far behind in units shipped for several years. In 1989, only a few hundred thousand 486 machines were sold, compared with two million 386 machines and 5.3 million 286 PCs, says David Cearley, program director at Gartner Group, Inc., a market

INSIDE

Power to Awaken
Only a 32-bit OS can unlock the riches of the 486. Page 83.

Product Guide
A list of 486-based PCs out now or shipping soon. Page 93.

Which Way Is Up?
There's more than one way to upgrade to higher power. Page 88.

Radding is a free-lance writer based in Newton, Mass.

HOW OTHERS SEE THE MACINTOSH-TO-MAINFRAME CONNECTION.

HOW AVATAR SEES IT.

When it comes to system integration, you don't have to treat the Mac differently than any other device on your network. Introducing the MacMainFrame Series, the broadest range of Macintosh-to-mainframe connectivity options available.

MORE CHOICES. MORE SOLUTIONS.

Now, in an integrated set of solutions, local or remote Mac users in Token Ring, SDLC or coax environments can tap centralized information to make every Mac user's desktop more powerful.

MacMainFrame distributes terminal emulation, file transfer, printer emulation and mainframe graphics across a wide variety of networking schemes.

Since it's fully AppleTalk compatible, EtherTalk, TokenTalk and LocalTalk networks are part of the solution, too.

For customization, there's Avatar's Programmer's Toolkit, a full range of Applications Programming Interface (API) tools. For example, Avatar's Hypercard API has been used to develop a front end system to PROFS, IBM's electronic mail system.

THE MACMAINFRAME DIFFERENCE.

Unlike some Mac-to-mainframe connections, MacMainFrame enhances the benefits of the Macintosh user experience.

Since MacMainFrame is completely IBM 3270 compatible, it has no impact on normal mainframe operations. The result? An integrated working environment that increases productivity and reduces headaches.

SOMETHING ELSE WE SEE. SERVICE.

With eight years of experience, Avatar offers something beyond products and technology. It's called responsiveness. You see, as the 3270 connectivity specialists, we have helped to integrate Macintosh computers and PC printers into many different environments. Which means we can do the same for you. With a single integrated set of solutions for Token Ring, SDLC, and coax, both standalone and via gateway.

To find out how, call this number toll free at

1-800-289-2526.

You'll find that we understand Macintosh-to-mainframe connectivity like no one else. So as your network options continue to grow, Avatar can help you see the forest through the trees.

Avatar.

65 South Street, Hopkinton, MA 01748

DCW2

© 1990 Avatar Corporation.

Speed

FROM PREVIOUS PAGE

research firm in Stamford, Conn.

Cearley says he expects the 386 to continue growing in popularity, reaching 4.6 million units sold in 1991 and 11.6 million in 1992; on the other hand, unit sales of the 486 are expected to grow to 300,000 in 1990, 600,000 by 1991 and 1.1 million in 1992.

Within the Fortune 500, companies are not rushing into any purchases, according to The Sierra Group, Inc., a market research firm in Tempe, Ariz. While 70% say they plan to evaluate the 486, they say they wouldn't make any purchases for about 12 to 18 months or until prices go down. Even when they do purchase 486s, Fortune 500 companies aren't eyeing large-scale purchases for the desktop. They say they will position the machines as local-area network file servers or engineering workstations for computer-aided design, graphics and statistical analysis.

The server area hasn't quite caught on, however. The newness of the 486 discourages some companies from implementing it. "There is no reason to go with Release 1 of anything, especially in an area as important as file serving," Bender says.

Instead, companies are more likely to install something that has already demonstrated some success, he explains.

Another problem is that the 486 chip does not address the major bottleneck in LAN file-serving applications: the operating system and the hard disk I/O.

"There's no difference when you use a 486 as a file server. You're already limited by the bandwidth of the token-ring network," says Art Block, vice-president of end-user automation support at Manufacturers Hanover Corp.

The difference, he says, comes when you use a 486 as an application server, where it is called on to perform application processing as well as simple file serving. Manufacturers Hanover is poised to do just that with its Lotus Development Corp. Notes application, which is set up to operate in a full client/server capacity.

"The server must perform Notes computations on behalf of many clients," Block explains. As such, it does more than simple file serving and, therefore, needs more processing horsepower.

Before the pendulum swings to the 486 as the corporate standard, a few things have to happen: Prices need to come down, and a new operating system, applications software and bus peripherals need to appear.

While 486-based machines are not a huge jump in cost above a 386-based machine and actually rate well in price/performance, they are generally still above the level that is acceptable to corporate buyers.

"They have to get below the $5,000 threshold before corporate buyers will start buying them," says Leslie Fiering, an analyst at Gartner Group, Inc.

A major constraint for the 486 is that neither DOS nor OS/2 at its current stage of development fully taps the processor's potential. In fact, there is still very little software that takes full advantage of the expanded instruction set or 32-bit architecture of the 386, never mind the 486.

"People are still running applications [on the 486] that were written for their ATs and even the original 8088/86 PCs," says Phil Magney, director of sales and marketing at ARS/Workstation Laboratories, a technology research firm in Irving, Texas.

Bit by bit

While Unix takes advantage of 32 bits, few PC users are willing to venture into that environment. It has been promised that OS/2 Extended Edition will take full advantage of the 486, but OS/2 Extended does not yet exist, and no one knows how far behind it applications might be.

"If you're buying a 486 to run OS/2 Extended Edition, OK — but if you're buying OS/2 to run DOS applications, there's no point in buying OS/2," says Tom Nolle, president of CIMI Corp., a technology assessment firm in Vorhees, N.J.

While Nolle usually steers his

Continued on page 84

New taste sensations

Although Intel's newly released 33-MHz I486 is expected to outsell the 25-MHz version by 1992, an I586 should outsell both of them by 1994

Number of units shipped (worldwide)

		1989	1990*	1991*	1992*	1993*	1994*
I486	25 MHz	10,000	400,000	1.1M	700,000	500,000	400,000
	33 MHz	0	10,000	400,000	1.1M	1.5M	1.5M
I586		0	0	10,000	400,000	1.1M	1.9M
Total 486/586		10,000	390,000	1.5M	2.2M	3.2M	3.8M

*Projected

Source: In-Stat, Inc.

CW Chart: Doreen Dahle

The workstation factor

As if corporate microcomputer purchasers didn't have enough to think about, now they have the slippery categories of "personal computer" and "workstation." As workstation prices decline and PCs grow more powerful, users can use either for intensive computational needs on the desktop.

Intel I486-based PCs have been found to meet and in some cases beat the performance of low-end reduced instruction set computing (RISC) workstations, according to ARS/Workstation Laboratories in Irving, Texas. The lab used Khornerstone benchmark ratings based on 21 tests measuring CPU, floating-point and disk I/O and tested such workstations as Digital Equipment Corp.'s Decstation 3100, Data General Corp.'s Aviion and Sun Microsystems, Inc.'s Sparcstation.

Varitech's Walker

But speed isn't everything; there's also functionality and price. RISC workstation prices have dipped below those of high-end PCs and offer better graphics and networking capabilities. Also, the 486 chip may have the power to provide workstation-like functionality, but DOS users "don't have anything to take advantage of it," says Tom Nolle, president of CIMI Corp. in Vorhees, N.J. Unix on a RISC workstation, he says, is a better alternative for users who need advanced functionality.

From a price/performance standpoint, says Andrew Allison, editor of "RISC Management Newsletter" in Los Altos, Calif., RISC servers and X Window System terminals could be an inexpensive replacement for PC LANs and PCs.

For now, users seem more inclined to stick to the PC route, if only to remain committed to DOS.

But there are voices of dissent. "We evaluated the lower priced RISC workstations [for three-dimensional CAD graphics], and if we were allowed to switch to Unix, we would be there," says Nolan Walker, managing director at Varitech in Beaumont, Texas.

ALAN RADDING

Happily ever-aftering with 32-bit partnering

BY SUZANNE WEIXEL

Intel Corp. I486-based hardware is a little like Cinderella; a heck of a workhorse but forced to wear hand-me-downs when it comes to applications.

What will play the prince's role in this tale, according to analysts, is a 32-bit operating environment. Only this kind of match will inspire software developers to produce designs that will bring out the processor's true potential.

Without a 32-bit operating system, a 486-based personal computer can merely run existing PC applications faster, says Karen Offermann, associate editor and analyst at Datapro Research Corp. in Delran, N.J. With a 32-bit operating system enabling multitasking, "the potential is outrageous," she says.

Turning point

According to Offermann, the turning point will come with the introduction of OS/2 Extended Edition, Microsoft Corp.'s 32-bit version of OS/2, which is expected later this year. For the first time in PC history, Offermann says, there will be a "marriage of powerful hardware with the appropriate software."

Of course, OS/2 Extended is not the only potential 32-bit partner for the 486. There is also Unix. Although Unix has one big strike against it — "a reputation of being arcane and difficult to use" — Offermann says she thinks it may actually be better able than OS/2 to exploit the potential of the 486 systems.

For instance, while both operating systems support multitasking, OS/2 needs to be networked to support multiple users. Also, Unix can be ported from larger systems, such as minicomputers, down to the Intel 80386- and 486-based PCs. More important, it is available now.

The aspect of portability could be quite important, especially in the early stages of the 486's existence. What will inspire many users to pledge fealty to the 468, says Andrew Seybold, publisher of "The Outlook on Professional Computing," a Santa Clara, Calif.-based industry newsletter, will not be a whole new playlist of applications but its ability to redub existing minicomputer applications, most of which are already running in 32-bit environments.

"Users already have their vertical packages, such as accounting and inventory control, running in 32-bit environments. If they can buy a 486 instead of a VAX and put it on someone's desk instead of hiring more MIS staff, of course they're going to do it," Seybold says.

Neither Unix nor OS/2 may seem at first glance like anyone's idea of a charismatic rescuer. The magic, analysts say, is in the 486's similarity to the 386. Until now, there had always been instability in the PC hardware platforms. But because the 486 is binary-compatible with the 386, writing for a 32-bit platform is a palatable idea to developers. With the two types of machines, they've got a bigger and steadier target at which to shoot.

With the 486, developers know they have a stable period of four or five years in which to get a return on their investment, says Leslie Fiering, an analyst at Gartner Group, Inc., in Stamford, Conn.

Slow resolution

No one really thinks this happy ending is going to arrive quickly. Paul Saffo, research fellow at the Institute for the Future in Menlo Park, Calif., believes that for a few years at least, the 486 will be put to use running souped-up 386 applications.

"Chances are, they will be quite dull in terms of new applications," Saffo says.

He does expect that the 486 will eventually redefine desktop applications. "In the year 2000, users won't be asking, does it run Lotus?" he says.

Like Seybold, Saffo says that one of the key attributes of the 486 hardware base is the fact that it is the first so-called PC powerful enough to support applications traditionally run from workstations and minicomputers. Saffo also says he thinks that the most vital function in a distributed networking environment is the ability of applications to interact with one another. He likens a 486 running a 32-bit operating system to time-sharing, with a twist.

"From your desktop, you'll be able to manage a sophisticated modeling task by sending some parts to a mainframe for processing and some parts to a supercomputer for processing and even some parts to a neural net[work] supercomputer for processing," he says.

Saffo says he envisions the 486 providing users with a link to outside sources for sophisticated data gathering.

"People will be less likely to turn the machines off. They'll come in in the morning and be able to make use of the work done by the computer overnight," he predicts. •

Weixel is a free-lance writer based in Framingham, Mass.

Continued from page 83

clients away from the 486 because of the limitations of DOS and the lack of applications for OS/2, he concedes that "the 486 is probably a smarter buy over a high-end 386, as long as you realize that there will be limited benefits."

For clients who really want the full advantages of the 486, such as true multitasking and multiuser functionality, Nolle suggests that "it is time to start asking about alternative operating systems" such as Unix. "The time is going to come when you don't want to stay in DOS."

Similarly, while many users run their 486-based PCs with the standard AT — or Industry Standard Architecture (ISA) — bus, "you really need a higher performance bus to support a higher performance system," Magney says.

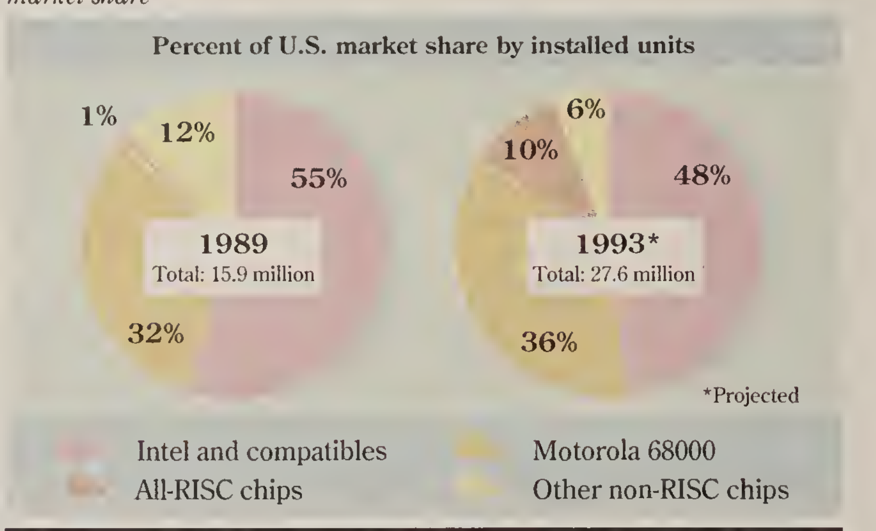
Currently, 52% of 486 users run the ISA bus, 23% use IBM's Micro Channel Architecture (MCA) and 25% use Extended Industry Standard Architecture (EISA), says John Dunkle, vice-president of Workgroup Technologies in Hampton, N.H. By 1993, he predicts, only 7% will use the ISA bus, with 58% opting for MCA and 35% for EISA.

If EISA boards become available in volume sooner, Dunkle notes, it will alter the 1993 projections, but the overall trend will remain the same — the 486 eventually will drive users to use new bus architectures.

Some buyers say that, at least in terms of their current needs, the bus issue is irrelevant. "We have an EISA machine, but we don't have any EISA cards in it," says Wilson Jones' Lange. The company uses two ISA cards — an IBM 3270 emulation card and a Token-Ring card — in its 486. Lange was under pressure to go with MCA for the sake of consistency with the company's base of Personal System/2 machines, but he resisted.

Coming up on the outside

RISC- and Motorola 68000 series-based workstations will snitch from Intel's market share



Source: Workgroup Technologies, Inc.

CW Chart: Doreen Dahle

Others, however, are coming close to hitting the wall with the limited capabilities of the ISA bus. "We're getting to the point where the bus is the limiting factor," Citibank's Bender says. "By the time we get to 50 MHz, the bus can limit performance. The ISA will choke a 486."

While corporate purchasers balk at standardizing on the 486, for niche users who want the power now, the price differential is actually not that great between a 33-MHz 386 machine and a 25-MHz 486. Buyers can pay up to $19,000, if they want a fully configured name-brand 486 PC, complete with extra cache and other bells and whistles. But a shopper who is willing to accept lesser known brands can get a simply configured 25-MHz 486-based machine for a little more than $5,000 through direct marketers.

When New York Telephone's Geier purchased his 486, he found "a very attractive price" from Digital Distributing. "The big vendors were too expensive. Digital Distributing was cheaper and had better performance," he says.

Manufacturers Hanover was paying about $7,500, on average, for a 386-based file server with 8M bytes of memory and a 325M-byte hard disk. For about 10% more ($8,200), the company purchased a 486-based file server from AST.

"What I'm spending hasn't really changed, but I'm getting more for the money," Block says.

The cost of the 33-MHz 386 is likely to drop; however, many observers expect the differential to remain slight.

Some argue that users who turn to lower priced 486-based machines from new, unproven vendors risk being left in the lurch when it comes to support.

Some observers attribute the difference in price to differences in the quality of components. Higher priced machines also come with 330M-byte hard drives, compared with 200M-byte drives, and an EISA or MCA bus rather than an ISA. Even when the less expensive 486-based PCs provide an EISA bus, they do not support all the bus master modes, Nolle adds.

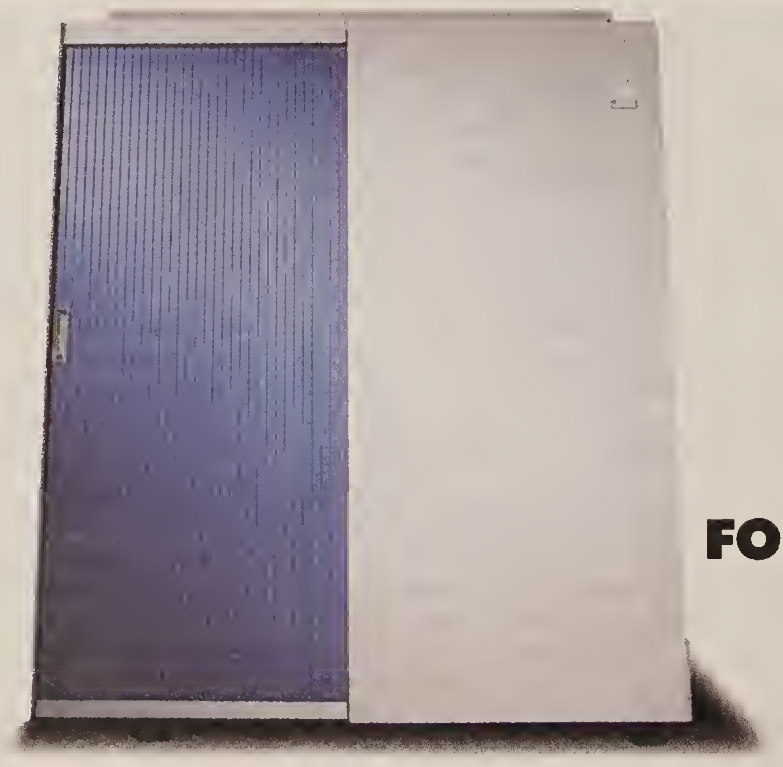
Which direction?

While some experts counsel users to wait for issues such as the operating system and bus master to clear, others dismiss the notion of waiting in the rapidly changing PC market. "New equipment is always going to come out that will be faster," Block says.

Others prefer to wait. "I won't do anything with a 25-MHz PC, not when 33-MHz and 50-MHz machines are coming fast," Bender says.

What users have to remember is that the premium you pay today buys you a short-lived advantage, with higher clock speeds such as 50 MHz expected this fall, not to mention the 586, 686 and 786 chips due out by the year 2000. •

INTRODUCING THE FO



FOCNET MAKES FOCUS THE EASIEST WAY

Now the shortest distance between two computers is a straight line—to the new FOCNET Connect Series.

It offers all the connections you need for complete data sharing between mainframe, mini and personal computers in your enterprise network. No matter what it is—from a LAN to a WAN.

FOCNET means fast access to distributed data. It's the only connectivity solution that gives you complete data access between network nodes. For any file type or operating system in use. Relational, non-relational, preexisting or new.

This advertisement refers to numerous software products by their trade names. In most, if not all cases, these designations are claimed as trademarks or registered trademarks by their respective companies.

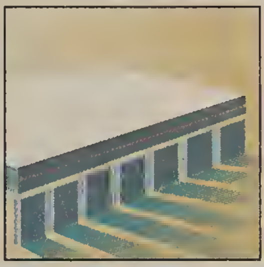
• SUN • RS/6000 • AT&T • IBM Mainframe • DEC/VAX • HP

FOCUS for DOS • OS/2 • LAN • SUN • RS/6000 • AT&T • IBM Mainframe • DEC/VAX • AS

Cache-ing in on 486 chips

BY DAVID CLAIBORNE

Systems developers are used to reducing numbers on price tags, not on feature descriptions. So when Intel Corp. announced its I486 chip with 8K bytes of internal cache — after people were used to hearing about the 80386's 32K bytes of external cache capability — many of the hardware producers questioned the wisdom of the move and felt compelled to compensate.



Of the vendors shipping 486-based machines in the next six months, about two-thirds have added external cache to their machines. Whether a buyer wants 64K bytes, 128K bytes or any extra cache at all is now a subject for debate.

One firm that tested both approaches before developing its Vectra 486 and decided that Intel probably knew best is Hewlett-Packard Co. Not only is it more expensive to design external cache, but performance improvements were marginal, according to Mark Koski, 486 product manager. Other trials bear out HP's conclusion.

On the other hand, Advanced Logic Research, Inc. (ALR) is of two minds on the matter, believing that while individual users working on a stand-alone 25-MHz machine probably do not need external cache, power users and file server applications do.

For that reason, says David Kirkey, vice-president of marketing and international sales, ALR leaves the decision up to the buyer. Its Businessveisa 486 has no other external cache, while the Powerveisa, Power/E and Power/4 all offer it. "If the user's needs change," Kirkey says, "a 64K-byte cache can be added for $600."

Intel itself says 8K bytes is just fine. According to the firm's published estimates, the "hit rate" — or the percentage of times the on-board cache contains the requested data — is 96% with DOS applications and 92% in multitasking operations.

The chip uses a four-way set-associative cache with a 16-byte line. This means that main memory is brought in 128 bits at a time, four times as fast as on the earlier 82385 controller. This reduces cache misses in consecutive data reads.

In addition, the cache is effectively split into four 2K-byte components, improving the performance when jumps are made between blocks of main memory. It is as if you needed to find a reference in a book and could look in four places at once.

What is becoming apparent, however, is that with higher clock speeds on the horizon, external cache will become more valuable. As processor speed increases, so does the severity of the penalty for a cache miss. At 25 MHz and a cycle time of 40 nsec, a cache miss requires four extra cycles to retrieve information from main memory.

At 33 MHz, with a cycle time of 30 nsec, that number may double to eight extra cycles. Although the hit rate remains the same, the penalty in terms of lost clock cycles and amount of idle processor time doubles.

Possibly in response to this — and coinciding with the 33-MHz version of the 486 chip — Intel has announced the Turbocache I486. This module provides a system with 64K or 128K bytes of external cache and uses the new 82485 cache controller to provide a two-way set-associative write-through implementation that works in conjunction with the 486's internal cache. The Turbocache I486 will be available in 25- and 33-MHz versions and will range in price from $250 to $450.

Intel predicts that the Turbocache will improve performance up to 15% in I486-based systems. According to Bill Rash, Intel's 386/I486 microprocessor focus group director in Santa Clara, Calif., "Applications software written for MS-DOS, Windows, OS/2 and Unix operating systems will continue to become more complex and benefit from a second-level cache." •

Claiborne is a consultant in Highland, Md.

Write-back soon

Advanced Logic Research and Arche Technologies use a write-back rather than Intel Corp.'s write-through caching scheme on their models with external cache.

On Intel chips, all writes to memory are written to the cache and then through to main memory. While this approach is very reliable, it can also bog down performance. When the processor is operating under a heavy load, such as a multiuser/multitasking environment, the memory bus is consumed primarily with write operations.

The write-back scheme is particularly beneficial in multitasking operations. In this approach, memory changes are made to the cache, and the main memory is updated only when the cache is to be flushed by new information that is coming in. While the vendors claim this speeds performance, there is a small chance that the main memory will fail to be updated.

DAVID CLAIBORNE

ET CONNECT SERIES.™

TO MOVE INFORMATION ALONG THESE LINES.

And, when FOCNET is combined with FOCUS, the world's most widely used 4GL, you get interoperability and true cooperative processing between PCs, LANs and mainframes. You can downsize applications to less expensive machines and use your processing power more efficiently—all the while preserving your investment in existing data. To learn more, call 1-212-736-4433, ext. 3700 or write Information Builders, 1250 Broadway, NY, NY 10001. If your job is getting data from here to there, you'll find FOCNET a *very* moving story.

FOCUS
Information Builders, Inc.

RS/6000 • AT&T • IBM Mainframe • DEC/VAX • AS/400 •

00 • HP • DOS • LAN • SUN • RS/6000 • AT&T • IBM Mainframe • DEC/VAX • RS/6000

Genuine 486™ System... Amazing 386™ PRICE!

Yes, full powered 80486 computer systems with all the traditional Northgate features and performance.

And a price that says "BUY NOW!"

$5,895.00

Delivered to Your Home or Office

YOU CAN'T IMAGINE WHAT SPEED REALLY IS until you have Northgate's new Elegance 486 under your fingertips. Feel the power! It delivers everything a 486 should do ... **AND MORE!** Applications—even CAD—appear on the screen almost before you release the keys. Gone is the aggravation of waiting!

Sizzling performance requires the hottest components ... and that's what Northgate delivers.

486 processor combines the capabilities of an enhanced 386, fast 387 math coprocessor, an advanced cache controller and 8K of supporting static cache memory. Result? Incredible processing speed!

Now add in Northgate's new proprietary motherboard. Unique design maximizes the power and features of the 486 processor.

And look at this! A Maxtor 200Mb hard drive. Breaks performance barriers with 15MS speed ... yet doesn't make a peep.

Impressed? There's more. 4Mb of RAM (expandable to 16Mb). And 64K of 25NS read/write-back cache (expandable to 256K). Of course, it comes with a Northgate *OmniKey*™ keyboard—your choice of PLUS or ULTRA models.

PLUS, Northgate has a full range of expansion options! Monitors, hard drives, tape backups, memory cards, printers, modems, and more. Custom configure the system that's right for you.

Use a Northgate 486/25 for 30 days. If it fails to do everything we say, just return it.

Special 486/33 Upgrade Offer

Buy your Elegance 486/25 now. And when you need more processing power, we'll upgrade it to a 486/33MHz for just **$1500.00!**

ORDER TODAY! Be sure to ask about custom configurations, leasing and financing programs.

CALL TOLL-FREE 24 HOURS A DAY

800-548-1993

Notice to the Hearing Impaired: Northgate now has TDD capability. Dial 800-535-0602.

NORTHGATE COMPUTER SYSTEMS™

"We hear you!"

1 Northgate Park, Northgate Parkway, Eden Prairie, MN 55344

Financing: Use your Northgate Big 'N' revolving credit card. We have millions in financing available. We accept Visa and MasterCard, too. Lease it with Northgate, up to five-year terms available.

Elegance™ 486/25 system configuration

- 25 MHz Intel 80486™ processor with 80387-compatible floating point coprocessor
- Industry Standard Architecture (ISA) bus
- 4Mb of 32-bit DRAM (expandable to 8Mb on the motherboard; total system RAM expandable to 16Mb with an optional memory card)
- Proprietary, U.S.-made motherboard
- 200Mb Maxtor hard drive with 15 MS access time
- 64K SRAM read/write-back cache (optional 256K cache available)
- High density 1.2Mb-5.25″ and 1.44Mb-3.5″ floppy drives; also reads, writes and formats low density disks
- Eight expansion card slots; one 32-bit, six 16-bit and one 8-bit
- Weitek numeric co-processor support
- Two serial and one parallel ports
- 14″ monochrome monitor
- Hercules compatible video controller
- MS-DOS 4.01 and GW-BASIC software; Smart Drive disk caching software
- On-line users guide to system and MS-DOS 4.01
- 220 watt power supply
- Elegance 7 drive-bay custom tower cabinet pictured (desktop style available)
- Clock/calendar with 5 year battery backup
- Your choice of exclusive award-winning *OmniKey*/PLUS or ULTRA keyboard
- Park utility
- Front mounted controls for high/low speed operation, system reset, and keyboard lockout
- Total compatibility with all of your existing AT peripherals and I/O boards
- FCC Class B Certified

Superior Northgate Support

Famous 30-Day Performance Guarantee. Northgate backs every system with our famous no-risk policy. If you aren't 100% satisfied, return it—no questions asked.

Warranties. Your system is covered by a 1-year limited warranty (5 years on keyboard). If a part fails, we'll ship a new one overnight at our expense—before we receive your troubled part.

Industry's Best Unlimited Toll-Free Technical Support. February 7, 1990, *BYTE* Magazine, Dr. Jerry Pournelle,* on Northgate technical support ... "has become the standard that other mail order computer companies must match."

Our system consultants are on duty 24 hours a day, 7 days a week to answer your questions. **On-site service** is available to most locations if we can't solve your problems over the phone.

Prices and specifications subject to change without notice. Northgate reserves the right to substitute components of equal or greater quality or performance. All items subject to availability.

©Copyright Northgate Computer Systems, Inc., 1990. All rights reserved. Northgate, *OmniKey* and the Northgate 'N' logo are registered trademarks of Northgate Computer Systems. 80386 and 80486 are trademarks of Intel.
All other products and brand names are trademarks and registered trademarks of their respective companies.

The 386 upgrade path is viable but tricky

BY DAVID S. VEALE

Even people in search of speed may want to ease slowly into Intel Corp. I486 functionality. With prices declining on 33-MHz Intel 80386-based systems, some buyers may prefer investing in these machines now and then upgrading later — or they may choose one of the "upgradable" 386s now being offered.

There are cautions along the upgrade path, however. The more leisurely pace may disqualify buyers from achieving full 486 functionality, not to mention causing them to spend more than they meant to or taking a partial loss on their 386 investment.

One method of upgrading is with a board that contains a 486 chip. The board attaches via cables to the 386 processor and 80387 math coprocessor socket after the chips are removed.

For many buyers, this option makes a lot of sense. A fast 386 may be all they need for the time being, and there are certainly far more price-competitive vendors from which to choose. In addition, by the time users complete the upgrade, the boards will most likely have come down in price.

In the end, however, this route may not always be economically practical. The reasons have to do with the architecture of the chips themselves.

While the instruction set and operating modes of the 486 are identical to those of the 386, the 486 has a built-in floating-point unit and 8K-byte memory cache and cache controller. On 386 PCs, these features are available only with the addition of the 387 chip, cache memory and the memory cache controller chip.

When the upgrade occurs, these chips are no longer needed, resulting in a wasted investment. In the case of the 387, this can be a loss of $450 to $575.

In addition, any external cache you already have on the 386 machine will be incompatible with the 486. While the 486 will usually ignore the existing external cache system entirely, this is nevertheless a waste of a potential performance enhancer. It also means that another premium-priced component of the existing system is wasted.

If you choose this upgrade route, you increase only processor efficiency, not clock speed. Thus, if you want to eventually have the equivalent of a 25-MHz 486, you need to start with a 25-MHz 386-based system.

If you put a 486 chip into a 386 machine with a slower clock speed, the new processor will be too fast for existing components. The computer will not boot properly, and even if it does, it will probably crash.

Strange behavior

One last problem you may encounter is some strange behavior from existing devices because of timing changes.

When a manufacturer of video cards upgraded its 25-MHz 386 to a 486 machine, the processor changed the system timing in such a way that it adversely affected the video performance of the machine, resulting in a 30% drop in overall performance.

Timing problems should not be an issue much longer, as peripheral manufacturers can modify the design of their products to accommodate 486-specific issues.

The other way to upgrade is to choose an upgradable machine, such as Compaq Computer Corp.'s Systempro, IBM's Personal System/2 Model 70, AST Research, Inc.'s Premium and Advanced Logic Research, Inc.'s Powerveisa. These machines come with a 386 processor that can be replaced with a 486.

Some, such as the Systempro, are also

Low money down

In some firms, it may make more economic sense to buy relatively low-priced Intel 80386-based machines and replace them with Intel I486s when needed, says Ben Myers, a consultant at Spirit of Performance, Inc. in Harvard, Mass. The 386 can then be passed on to an employee who has outgrown his Intel 8086- or 80286-based system.

With some 386 machines now hovering near the $2,000 mark, this strategy may make a lot of sense. Northgate, a maker of mail-order high-performance PCs, sells a 25-MHz, 486-based computer for $5,895 with 4M bytes of random-access memory and a 200M-byte hard disk. A company could buy such a machine and an off-brand 386 system for less than the price of one 486-upgraded AST Premium.

DAVID S. VEALE

1990. The missing
north of New York.

Integrated network management is about to undergo a major evolution. Thanks to the new NYNEX® ALLINK™ Operations Coordinator.

Chances are your corporate network is made up of elements from a variety of manufacturers. The people at the NYNEX Science and Technology Center know that. Which is why they invented ALLINK.

ALLINK integrates information from your existing network element managers. So you can make better network management decisions. While preserving your investment in existing systems. This major breakthrough is now available through NYNEX Information Solutions Group.

This application heralds the introduction of a new concept in network management called the NYNEX ALLINK Network Management Solution. It will become a seamless, integrated network

designed to support multiple 386 or 486 processors.

With these upgradable machines, the upgrade is simple and, unlike third-party upgrades, is supported by the vendor. In addition, you can increase both clock speed and processing speed.

Costly configuration

While some of these upgradable systems provide a growth path, their very configuration can make that path expensive.

Many of the manufacturers put the processor and at least some of the memory on an expansion card, not on the system board, as in more standard systems. The expansion board is removable and replaceable, but only with a board produced by the manufacturer.

In addition, there is the question of what to do with the 386 card, which will work only in the make and model of the original machine.

With the exception of the PS/2 Model 70, there is a premium to be paid for buying a 386-based system now and upgrading later. ALR's Powerveisa 33-MHz 386 machine has a base price of about $3,500. The 386 processor card can be replaced with a 25-MHz 486 card for $1,995 (including a $200 credit for returning your 386 card). The entire procedure ends up being about $1,500 more expensive than initially buying the 486 version of the machine.

At $3,195, a 33-MHz upgrade costs substantially more. AST's path is even more expensive. The Premium comes with a 16-MHz 80386SX on an expansion card for about $2,700 — with no hard disk.

The 25-MHz 486 upgrade card costs a whopping $7,695. A 33-MHz 486 upgrade adds up to $4,195, which is about $3,500 more expensive than buying the 33-MHz 486 AST Premium in the first place.

The one bargain here is the PS/2 Model 70. The 25-MHz 386 version sells for about $9,000, which includes a 120M-byte hard disk. The 486 upgrade costs $3,500, bringing the system's price to $12,500. An equivalent Model 70 with a 486 costs $13,000. ●

Veale is the PC coordinator for IDG Communications/Peterborough, Inc.

ASK THE VENDOR

We recently started using the Micro Frame 486M board, which has just eight slots. Is there any way we can increase the number of slots?

Gary Archibald
President
SBS Dataproducts
Denver

MONOLITHIC SYSTEMS CORP.: One, you could move to the Micro Frame 486 EX, a 14-slot Intel I486-based EISA motherboard, which accepts AT-style boards. Or you could keep using the eight-slot board but free up some of the slots by installing the Micro Paq 452 VGA multifunction card. It consolidates functions that normally would take up three separate slots.

We have a Compaq Computer Corp. 386/25 server running SCO Unix connected to 40 workstations with Corollary's 8 x 4 multiport subsystem. How difficult would it be to convert to a multiprocessing system?

David Taylor
Planning Program Coordinator
Department of Planning
Tucson, Ariz.

COROLLARY, INC.: The multiprocessor version of SCO Unix — called SCO MPX — was designed by Corollary to be 100% compatible with the single-processor version of SCO Unix. Compatibility is preserved for the device drivers, applications, data and file systems.

We use Microway's NDP Fortran 386 compiler and have a 486 version on order. What is the difference between the 386, I486 and I860 compilers?

James Cutler
Operations Manager
Dynamic Matrix Control Corp.
Houston

MICROWAY, INC.: Microway's I860 compiler can be used as a cross compiler and native compiler with a proprietary tool chain (assembler, linker, loader and debugger), which operates against COFF formatted files. You need a DOS extender to run the compiler.

Intel's 80386 or I486 compilers are native compilers that support multiple tool chains. Phar Lap Software, Inc. and Intel OMF files are supported, and a DOS extender is needed to run the application.

The I860 numeric coprocessor supports multiple operations on a single chip. You would need an Intel 80387 or a Weitek 3167/4167 to achieve the same functionality on the 386 and I486, respectively.

The I860 is up to 300% faster than the 386 and I486 in selected numeric-intensive applications. But in terms of price, the 386 or I486 plus numeric coprocessor solution is about one-third that of the I860.

link is discovered

management system, streamlining everything from operations to administration, performance and design.

If your company is digging around for a new and innovative solution, the NYNEX family of companies would like to help. We offer you everything from communications and computer systems, to professional services, to advanced software and systems and network integration. Call us at 1 800 535-1535 and get a closer look at what's been missing from connectivity.

Need to communicate? Need to compute? The answer is

NYNEX®

© 1990 NYNEX Corporation

MONO

Traditional PC LAN

AViiON is a trademark of Data General Corporation. UNIX, Novell NetWare, MS/DOS, OS/2, and Macintosh are the respective registered trademarks of AT&T, Novell Inc., Microsoft Corp., International Business Machines, Inc., and Apple Computer, Inc. ©1990 Data General Corporation.

VS. MULTI

PC LAN with AViiON Server

Call 1-800-DATAGEN to learn how Data General and Novell NetWare let your PC LAN do more.

Data General has a host of Novell Portable NetWare® solutions that let your existing PC LAN run multiple applications simultaneously. Novell Portable NetWare on a Data General AViiON™ gives your PC LAN the power to share MS/DOS®, OS/2®, MAC/OS®, and UNIX® files. The power to cruise through MS/DOS, OS/2, and UNIX applications. And, the power to share peripherals.

Data General's NetWare for AViiON is the first RISC-based NetWare platform. It's fully scalable and can share the server with major standards like TCP/IP. It also uses the standard NetWare client software and Novell's IPX/SPX Networking Protocol, so it interoperates with existing Novell LANs. It lets users access scores of applications. And, Data General offers a Software Developer's Kit to facilitate the development of client-server applications.

Data General's line of Novell NetWare solutions brings transparent networking and distributed applications to all your PC clients.

To learn more about how an AViiON server with Novell's Portable NetWare can bring more power and more applications to your LAN, call the distributors listed below or 1-800-DATAGEN. Also, ask about Data General's full line of PCs.

Data General
3400 Computer Drive, Westboro, MA 01580

DATA GENERAL'S NOVELL NETWARE DISTRIBUTORS

GATES/FA Distributing
121 Interstate Blvd.
Greenville, SC 29616
Sales: 800-332-2222
Customer Support: 800-332-2299
Technical Support: 800-332-2315
Credit: 800-332-3497

Western Microtechnology, Inc.

1637 North Brian Street
Orange, CA 92667
(714) 637-0200

14636 N.E. 95th Street
Redmond, WA 98052
(206) 881-6737

6837 Nancy Ridge Drive
San Diego, CA 92121
(619) 453-8430

12900 Saratoga Avenue
Saratoga, CA 95070
(408) 725-1660

28720 Roadside Drive
Agoura Hills, CA 91301
(818) 707-0377

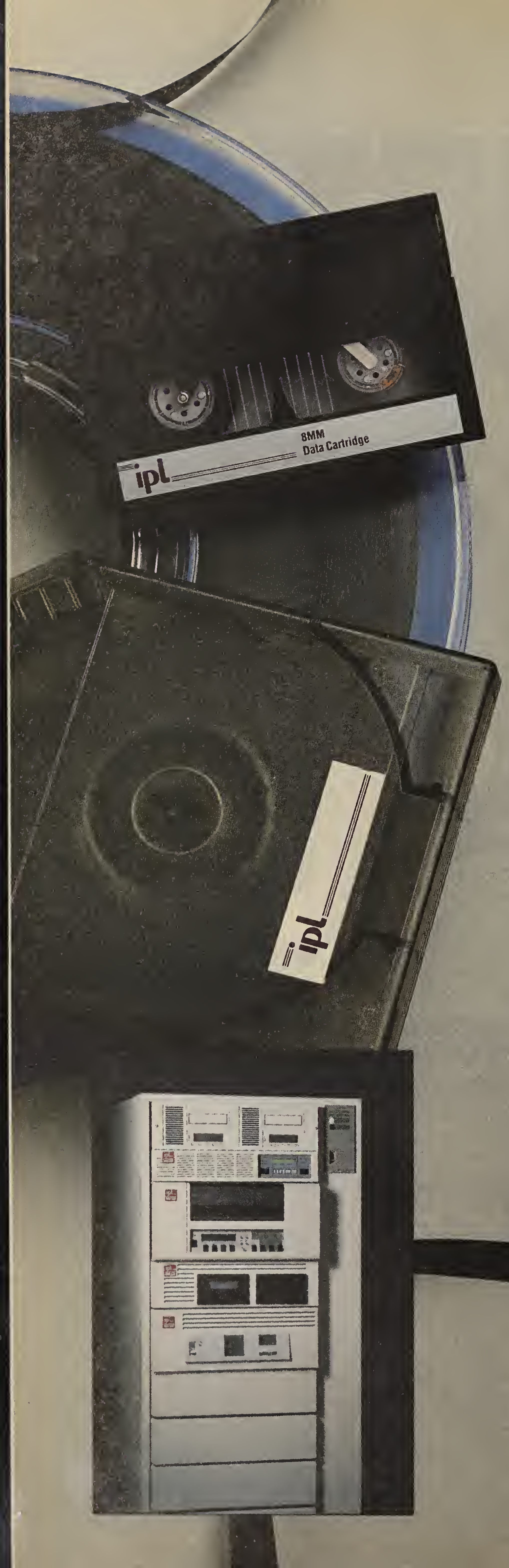
1800 N.W. 169th Place
Beaverton, OR 97006
(503) 629-2082

20 Blanchard Road
Burlington, MA 01803
(617) 273-2800

2545 Tarpley Road
Carrollton, TX 75006
(214) 416-0103

264 Passaic Avenue
Fairfield, NJ 07006
(201) 882-4999

Four Eves Drive
Marlton, NJ 08053
(609) 596-7775



If you think mixing these media would take more than one controller, you haven't heard of IPL.

Tired of paying for a separate controller every time you buy a new IBM-compatible tape device? With IPL's 6800 Series, you don't have to. Each member of our family of tape devices operates on a single universal controller, giving you maximum flexibility at a minimum cost.

Take our new rack-mountable ½″ cartridge tape subsystem as an example. With a standard 18-track format and a data rate of 3 MB/sec., the IPL 6890 ½″ cartridge device offers IBM users high performance and high capacity. What's more, the 6890's optional automatic cartridge loader allows uninterrupted loading of up to 10 cartridges, giving you a backup capacity of 2 GB (or, with data compression, up to 4 GB).

And perhaps most important, current IPL tape users can add the 6890 to their IBM system without buying a new controller.

The same is true for every storage device in our 6800 Series, including our 3422-compatible reel-to-reel tape drive and our 8 mm cartridge drives using helical scan technology. By ensuring that each of our current and planned tape storage devices operates on one controller, we make it easy for you to add units as your needs change—or as technology advances. And every 6800 device is compatible with IBM's AS/400™ (B30–B70), System 38, 9370 and 43XX machines.

With over 16 years of IBM plug-compatible experience, IPL understands the importance of solid support. Over 100 service locations, providing maintenance repair and spare parts, are supported by our Waltham technical support staff 24 hours a day, 7 days a week. In addition, our Belgian support office, located just outside of Brussels, services IPL distributors in 17 European countries.

All in all, over 2,500 installations worldwide benefit from IPL's commitment to high quality support for the 6800 Series product line.

For more information about the 6800 Series of IBM-compatible tape subsystems, U.S. customers may call 1-800-338-8ipl (in MA: 617-890-6620; Fax: 617-890-8128). European customers may contact us at our U.S. office—or at the IPL Systems International Office, Kerberg Park, Pavillion 406, Imperiastraat 10, Zaventem, Belgium; Tel: 32-2-725.40.87 (Fax: 32-2-725.40.29).

IBM and AS/400 are registered trademarks of International Business Machines Corporation.

ipl systems, inc.

The Storage Alternative

486-based machines

COMPANY	PRODUCT NAME	CLOCK SPEED (MHz)	OPERATING SYSTEMS SUPPORTED	BUS ARCHITECTURE	COPROCESSOR SUPPORT[1]	MEMORY CACHE[2]	CACHE CONTROLLER	RAM: STANDARD/MAXIMUM	FLOPPY DRIVE	HARD DRIVE: STANDARD/ MAXIMUM	CONTROLLER	STORAGE BAYS: HALF HEIGHT/ FULL HEIGHT	GRAPHICS STANDARD	NUMBER OF SERIAL/ PARALLEL PORTS	NUMBER AND TYPE OF EXPANSION SLOTS	DIMENSIONS (IN.)	PRICE
Acer America Corp. **(408) 922-0333**	Acer 1200	25	DOS, Microsoft Windows	EISA	Weitek 4167, built into I486	8K, 128K	Intel 82385	4M/64M	One 5.¼-in. 1.2M	None	IDE	Five 5¼-in.	None	2/1	Eight 32-bit	6.3 x 20.9 x 16.5	$9,995
	Acer 1170	25	DOS, Microsoft Windows	ISA	Weitek 4167, built into I486	8K	Internal cache only	4M/64M	One 3½-in. 1.44M	None	IDE	Four 3½-in.	None	2/1	Four 16-bit	5 x 14.2 x 16.2	$5,995
Advanced Logic Research, Inc. **(714) 581-6770,** **(800) 444-4257**	Powercache 33/4 Models 120, 330H, 660H	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	MCA	Built into I486	8K, 128K	Proprietary	8M/32M	One 3½-in. 1.44M	120M (Model 120), 330M (Model 330H and 660H)	ESDI (Model 330H), ESDI and SCSI	2/2 and one 3½-in. (Models 330 and 660), four 3½-in. (Model 120)	Optional VGA	1/1	Four 16-bit, two 32-bit, one 64-bit proprietary	6 x 15 x 17 (Model 120), 23 x 7.4 x 17.5 (Models 330 and 660)	$11,690 (Model 120), $15,690 (Model 330H), $17,690 (Model 660H)
	Powercache 4 Models 120, 150, 340H, 650H	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	MCA	Built into I486	8K, 128K	Proprietary	8M/32M	One 3½-in. 1.44M	120M (Model 120), 150M (Model 150), 340M (Model 340H), 650M (Model 650H)	ESDI	NP	Optional VGA	1/1	Four 16-bit, two 32-bit, one 64-bit proprietary	23 x 7.4 x 17.5 (tower), 6 x 15 x 17 (desktop)	$9,690 (Model 120), $11,190 (Model 150), $14,190 (Model 340H), $16,190 (Model 650H)
	Powercache 4e Models 150, 340H, 650H	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Weitek 4167, built into I486	8K, 128K	Proprietary	8M/ 128M	One 3½-in. 1.44M	150M (Model 150), 340M (Model 340H), 650M (Model 650H)	ESDI	2/2 and one 3½-in.	VGA	1/1	One 8-bit ISA, four 16-bit, two 32-bit EISA, one 64-bit proprietary	23 x 7.4 x 17.5	$11,490 (Model 150), $14,490 (Model 340H), $16,490 (Model 650H)
	Powerveisa 486/33 Models 80, 110, 150, 330	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Intel 80387, Weitek 4167, built into I486	8K, 64K	Proprietary	5M/49M	One 5¼-in. 1.2M	80M (Model 80), 106M (Model 110), 150M (Model 150), 330M (Model 330)	IDE, ESDI	2/2 and one 3½-in.	Optional VGA	1/1	One 8-bit ISA, two 16-bit ISA, three 32-bit EISA, three 32-bit proprietary	23 x 7.4 x 17.5	$8,495 (Model 80), $8,695 (Model 110), $10,495 (Model 150), $12,495 (Model 330)
	Powerveisa 486/25 Models 80, 110, 150, 330	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Intel 80387, Weitek 4167, built into I486	8K, 64K	Proprietary	5M/49M	One 5¼-in. 1.2M	80M (Model 80), 106M (Model 110), 150M (Model 150), 330M (Model 330)	IDE, ESDI	2/2 and one 3½-in.	Optional VGA	1/1	One 8-bit ISA, two 16-bit ISA, three 32-bit EISA, three 32-bit proprietary	23 x 7.4 x 17.5	$7,495 (Model 80), $7,695 (Model 110), $9,495 (Model 150), $11,495 (Model 330)
	Businessveisa 486/25 Models 1, 40, 50, 110	25 or 33	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Intel 80387, Weitek 4167, built into I486	8K	Internal cache only	2M/49M	One 5¼-in. 1.2M (Model 1), 3½-in. 1.44M	None (Model 1), 40M (Model 40), 80M (Model 50), 106M (Model 110)	IDE	4/2 3½-in.	Optional Super VGA	1/1	One 8-bit ISA, two 16-bit ISA, three 32-bit EISA, three 32-bit proprietary	6 x 15 x 17	$4,999 (Model 1), $6,599 (Model 40), $6,999 (Model 80), $7,199 (Model 110)
	Powerflex (upgradable 286 machine)	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Built into I486	8K	Internal cache only	1M/16M	One 3½-in. 1.44M	None	NA	2/2 3½-in.	None	1/1	One 8-bit, five 16-bit	6 x 15 x 17	$1,495 for machine; $1,995 for 486 upgrade board
AGI Computer, Inc. **(415) 683-2357**	Model 4000A (desktop), Model 4100A (upright)	25	DOS 3.3, 4.01	ISA	Weitek 4167, built into I486	8K, 64K, expandable to 256K	Proprietary	4M/16M	One 5¼-in. 1.2M	None	NA	5/0 (desktop), 4/2 (upright)	None	1/1	One 8-bit, six 16-bit, one 32-bit proprietary	6.5 x 21.2 x 16.5 (desktop), 25.5 x 7 x 18 (upright)	$7,994 (desktop), $8,594 (upright)
Altos Computer Systems **(408) 432-6200**	Altos Multiuser System 5000	25	Altos Unix System V/386	EISA	Built into I486	8K, 128K	Proprietary	8M/64M	One 5¼-in. 1.2M and one 3½-in. 1.44M	440M/29G	SCSI	5/0	VGA plus	2/1	Eight 32-bit	26.5 x 8 x 19	$25,000 (440M), $40,000 (two 440M)
Arche Technologies, Inc. **(800) 422-4674**	Arche Pro-File 486-33	33	DOS 3.3, 4.01, Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 256K	Proprietary	4M/64M	One 5¼-in. 1.2M, optional one 3½-in. 1.44M	Optional 20M/760M	MFM, optional ESDI, RLL, SCSI, ST 506/412	Two 5¼-in., two 3½-in./two 5¼-in.	Monochrome	2/1	Two 8-bit, six 16/8-bit	19.5 x 5.5 x 24	$9,695
	Arche Legacy 486	25	DOS 3.3, 4.01, Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 256K	Proprietary	4M/64M	One 5¼-in., 1.2M, optional one 3½-in. 1.44M	Optional 20M/760M	MFM, optional ESDI, SCSI	5/0	Monochrome	2/1	Two 8-bit, six 16-bit	6.25 x 21 x 16.25	$8,995
	Arche Legacy 486-33E	33	DOS 3.3, 4.01, Unix, Xenix	EISA	Weitek 4167, built into I486	8K, 256K	Proprietary	4M/64M	One 5¼-in., 1.2M, optional one 3½-in. 1.44M	Optional 20M/760M	MFM, optional ESDI, RLL, SCSI, ST 506/412	5/0	Monochrome	2/1	Four 32-bit EISA, two 8-bit	19.5 x 5.5 x 24	$10,495
	Arche Legacy 486-33	33	DOS 3.3, 4.01, Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 256K	Proprietary	4M/64M	One 5¼-in., 1.2M, optional one 3½-in. 1.44M	Optional 20M/760M	MFM, optional ESDI, RLL, SCSI, ST 506/412	Five 5¼-in./0	Monochrome	2/1	Two 8-bit, six 16-bit	19.5 x 5.5 x 24	$9,495
AST Research, Inc. **(714) 727-4141**	Premium 486/33E Model 115, Model 325	33	DOS 3.3, 4.01 OS/2, Unix, Xenix	EISA	Intel 80387, Weitek 4167, built into I486	8K	Internal cache only	4M/48M	One 5¼-in. 1.2M	110M/320M	AT-embedded, ESDI	5/0	None	2/1	Four 16-bit, three 16/32-bit	6.25 x 19.25 x 16.5	$12,545 (110M), $14,245 (320M)
	Premium 486/33 Model 5	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA	Intel 80387, Weitek 4167, built into I486	8K	Internal cache only	4M/48M	One 5¼-in. 1.2M	None	NA	5/0	None	2/1	Four 16-bit, three 16/32-bit	6.25 x 19.25 x 16.5	$9,995
	Premium 486/33 Model 115, Model 320	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA	Intel 80387, Weitek 4167, built into I486	8K	Internal cache only	4M/48M	One 5¼-in. 1.2M	110M/320M	IDE, ESDI	5/0	None	2/1	Four 16-bit, three 16/32-bit	6.25 x 19.25 x 16.5	$11,495 (110M), $13,645 (320M)

[1] I486 chip already has a built-in coprocessor.

[2] I486 chip includes 8K of on-chip cache.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

COMPANY	PRODUCT NAME	CLOCK SPEED (MHz)	OPERATING SYSTEMS SUPPORTED	BUS ARCHITECTURE	COPROCESSOR SUPPORT[1]	MEMORY CACHE[2]	CACHE CONTROLLER	RAM: STANDARD/MAXIMUM	FLOPPY DRIVE	HARD DRIVE: STANDARD/MAXIMUM	CONTROLLER	STORAGE BAYS: HALF HEIGHT/FULL HEIGHT	GRAPHICS STANDARD	NUMBER OF SERIAL/PARALLEL PORTS	NUMBER AND TYPE OF EXPANSION SLOTS	DIMENSIONS (IN.)	PRICE
AST Research, Inc. (714) 727-4141	Premium 486/33TE Model 5	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Intel 80387, Weitek 4167, built into I486	8K, expandable to 128K	Proprietary	4M/48M	One 5¼-in. 1.2M	None	NA	6/0	None	2/1	Seven 16-bit EISA, three 16/32-bit	24.25 x 14 x 17.9	$11,995
	Premium 486/33TE Model 325, Model 665, Model 1005	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	EISA	Intel 80387, Weitek 4167, built into I486	8K, expandable to 128K	Proprietary	4M/48M	One 5¼-in. 1.2M	320M, 660M, 1G	SCSI	6/0	None	2/1	Seven 16-bit EISA, three 16/32-bit	24.25 x 14 x 17.9	$15,895 (320M), $17,195 (660M), $19,995 (1G)
Blackship Computer Systems, Inc. (415) 770-9300	Blackship	25	DOS 4.01	ISA	Weitek 4167, built into I486	8K, 64K, expandable to 256K	Proprietary	1M/16M	One 5¼-in. 1.2M	158M/676M	MFM, ESDI, RLL, SCSI, Western Digital 1007	5/0	VGA	2/1	Eight 16-bit	6.5 x 16.5 x 21	$5,495 (158M)
Blue Dolphin Computers (800) 345-0633	BDC 486-25	25	DOS 3.3, 4.01	ISA	Built into I486	8K, 128K	Intel chip set	1M/16M	One 5¼-in. 1.2M, one 3½-in. 1.44M	50M/ Unlimited	IDE	4/0	Paradise, Super VGA	2/1	Two 8-bit, five 16-bit, one 32-bit	7 x 16 x 14	$3,899 (50M)
C² Micro Systems (415) 683-8888	C² 486L	25	DOS 4.01	ISA	Weitek 4167, built into I486	8K, optional 128K	Internal cache only, optional proprietary	2M/32M	One 5¼-in. 1.2M	44M/675M	IDE	5/2	None	2/1	Eight 16-bit	6.5 x 21 x 17	$4,195 (44M)
Cache Computers, Inc. (415) 226-9922	Cache 486-25/AT, Cache 486-33/AT	25 or 33	DOS 3.3, 4.01, SCO Unix, Interactive Systems' Unix System V	ISA	Intel 80387 and compatibles, built into I486	8K, 128K	Proprietary	4M/16M	One 5¼-in. 1.2M or 3½-in. 1.44M	110M/700M	ESDI	4/2	VGA	2/1	Two 8-bit, six 16-bit	2.5 x 7 x 16	$4,990 (147M)
CCS Custom Computer Systems, Inc. (201) 729-6762	CCS 486-25c Model J4VMW	25	DOS 4.01	EISA	Weitek 4167	8K, 128K	Proprietary	4M/32M	One 5.25-in. 1.2M, one 3.5-in. 1.44M	212M/four 778M	SCSI	12/0	VGA	2/2	One 8-bit, one 16-bit, six 32-bit-EISA	31 x 10 x 26	$10,000 (212M)
Cheetah International, Inc. (214) 757-3001, (800) 243-3824	Cheetah Gold 425, Cheetah Gold 433	25 or 33	DR DOS 5.0	ISA	Built into I486	8K	Internal cache only	8M/16M	One 5¼-in. 1.2M, optional 3½-in. 1.44M	60M/1.2G	ESDI, RLL, SCSI	8/0	VGA	2/2	One 8-bit, seven 16-bit	24 x 7.63 x 22.5	$5,995 (60M), $9,995 (383M)
Club American Technologies, Inc. (415) 683-6600	Hawk II	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 64K, expandable to 256K	Proprietary	4M/16M	One 5¼-in. 1.2M	71M/651M	MFM	8/3	VGA	1/1	One 8-bit, six 16-bit, one 32-bit	25 x 7 x 18.5	$4,995 (71M)
	Hawk III	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 64K, expandable to 256K	Proprietary	4M/16M	One 5¼-in. 1.2M	71M/651M	MFM	8/3	VGA	2/1	One 8-bit, six 16-bit, one 32-bit	25 x 7 x 18.5	$7,995 (71M)
Compaq Computer Corp. (713) 374-4616	Deskpro 486/25 Model 120	25	DOS 3.3, 4.01, OS/2	EISA	Intel 80387, socket for Weitek 4167, built into I486	8K, 128K	Proprietary	4M/100M	One 5¼-in. 1.2M	120M	Integrated	4/3, 1/3 height	VGA	1/1	One 32-bit, seven 8/16/32-bit EISA	6.5 x 19.2 x 17.7	$13,999 (120M)
	Deskpro 486/25 Model 320	25	DOS 3.3, 4.01, OS/2	EISA	Intel 80387, socket for Weitek 4167, built into I486	8K, 128K	Proprietary	4M/100M	One 5¼-in. 1.2M	320M	ESDI	4/3, 1/3 height	VGA	1/1	One 32-bit, seven 8/16/32-bit EISA	6.5 x 19.2 x 17.7	$17,499 (320M)
	Deskpro 486/25 Model 650	25	DOS 3.3, 4.01, OS/2	EISA	Intel 80387, socket for Weitek 4167, built into I486	8K, 128K	Proprietary	4M/100M	One 5¼-in. 1.2M	650M	ESDI	4/3, 1/3 height	VGA	1/1	One 32-bit, seven 8/16/32-bit EISA	6.5 x 19.2 x 17.7	$20,499 (650M)
Compuadd Corp. (800) 456-3116	Compuadd 425	25	DOS 4.01, Microsoft Windows 3.0	ISA	Built into I486	8K	Internal cache only	4M/16M	One 5¼-in. 1.2M or one 3½-in. 1.44M	80M	IDE	3/0	VGA	2/1	Two 8-bit, three 16-bit	4.13 x 16.25 x 15.5	$4,995 (80M)
Copam USA, Inc. (415) 623-8911	PC 486V/25 EISA	25	DOS 3.3, 4.01	EISA	Built into I486	8K, optional 64K	Internal cache only, optional proprietary	2M/32M	One 5.25-in. 1.2M	Optional 111M/700M	IDE, proprietary intelligent 32-bit EISA	3/2	Optional VGA	2/1	Two 16-bit, six 32-bit	27.3 x 6.5 x 19.1	$5,699, $6,799 (111M)
CSS Laboratories (714) 852-8161	Max Sys 486T/25	25	DOS 3.3, OS/2, Unix	ISA	Socket for Weitek 4167, built into I486	8K	Internal cache only	4M/16M	One 5¼-in. 1.2M	106M/1.2G	ESDI, optional SCSI	10/5	None	2/1	Two 8-bit, eight 16-bit, two 32-bit	25 x 7.5 x 24.5	$8,999 (106M)
	Max Sys 486MT/25	25	DOS 3.3, OS/2, Unix	ISA	Socket for Weitek 4167, built into I486	8K	Internal cache only	4M/16M	One 5¼-in. 1.2M	106M/1.2G	ESDI, optional SCSI	5/2	None	2/1	Two 8-bit, eight 16-bit, two 32-bit	25 x 7.5 x 16.5	$8,079 (106M)
	Max Sys 486T/33	33	DOS 3.3, OS/2, Unix	ISA	Socket for Weitek 4167, built into I486	8K	Internal cache only	4M/16M	One 5¼-in. 1.2M	106M/1.2G	ESDI	10/5	None	2/1	Two 8-bit, eight 16-bit, two 32-bit	25 x 7.5 x 24.5	$9,572 (106M)
Datamedia Corp. (603) 886-1570	Netmate/DX 425-00	25	DOS 3.3, 4.01, OS/2, Unix	ISA	Built into I486	8K	Internal cache only	4M/20M	None	None	NA	Two 1/3 height	VGA	1/1	Three 16-bit, one 32-bit	15.2 x 14.5 x 4.5	$7,695
	Netmate/DX 425-01	25	DOS 3.3, 4.01, OS/2, Unix	ISA	Built into I486	8K	Internal cache only	4M/20M	One 3.5-in. 1.44M	None	NA	Two 1/3 height	VGA	1/1	Three 16-bit, one 32-bit	15.2 x 14.5 x 4.5	$7,995
	Netmate/DX 425-A0	25	DOS 3.3, 4.01, OS/2, Unix	ISA	Built into I486	8K	Internal cacbe only	4M/20M	One 3.5-in. 1.44M	100M	IDE	Two 1/3 height	VGA	1/1	Three 16-bit, one 32-bit	15.2 x 14.5 x 4.5	$9,690 (100M)
Dell Computer Corp. (512) 338-4400	Dell System 425E	25	DOS 3.3, 4.01, OS/2, Unix	EISA	Socket for Weitek 4167, built into I486	8K	Internal cache only	4M/16M	One 5¼-in. 1.2M or one 3½-in. 1.44M	80M/660M	ESDI, IDE	5/2	VGA	2/1	Two 16-bit ISA, six 32-bit EISA	6.4 x 21.1 x 17.6	$7,899 (80M)
Digital Distributing, Inc. (401)885-6697	486-Executower	25 or 33	DOS 4.01, OS/2, Unix System V	ISA (25MHz), EISA (33MHz)	Weitek 4167, built into I486	8K, 128K (25MHz), 8K, 256K (33MHz)	Proprietary	4M/16M (25MHz), 4M/64M (33MHz)	One 5.25-in. 1.2M, one 3.5-in. 1.44M	85M/7G	SCSI	5/0	Super VGA	2/1	Eight 16-bit	16 x 10 x 17.5	$6,792 (25MHz, 85M), $8,792 (33MHz, 85M)

COMPANY	PRODUCT NAME	CLOCK SPEED (MHz)	OPERATING SYSTEMS SUPPORTED	BUS ARCHITECTURE	COPROCESSOR SUPPORT[1]	MEMORY CACHE[2]	CACHE CONTROLLER	RAM: STANDARD/MAXIMUM	FLOPPY DRIVE	HARD DRIVE: STANDARD/MAXIMUM	CONTROLLER	STORAGE BAYS: HALF HEIGHT/FULL HEIGHT	GRAPHICS STANDARD	NUMBER OF SERIAL/PARALLEL PORTS	NUMBER AND TYPE OF EXPANSION SLOTS	DIMENSIONS (IN.)	PRICE
Dolch Computer Systems **(408) 435-1881**	P.A.C. 486-25	25	DOS 4.01	ISA	Weitek 4167, built into I486	8K	Internal cache only	2M/16M	One 3½-in. 1.44M	100M/200M	IDE	2/0	VGA	1/1	One 8-bit, two 16-bit	16 x 9.5 x 7.8	$12,995
DTK Computer, Inc. **(818) 333-7533**	Feat-2502	25	DOS, OS/2, SCO Unix, Xenix	NP	Weitek 4167	8K	Internal cache only	8M/16M	None	None	NA	7/0	None	None	One 8-bit, six 16-bit, one 32-bit	19 x 7 x 6	$5,251
Dyna Micro, Inc. **(408) 943-0100**	Dyna Work Master 486 25 (color)	25	DOS 3.3, 4.01	ISA	Built into I486	8K, 128K	NP	8M/16M	One 5¼-in. 1.2M, one 3½-in. 1.44M	Optional 106M/2.5G	ESDI	6/0	Super VGA	1/1	Two 8-bit, five 16-bit, one 32-bit	25 x 9.5 x 18.75	$5,895
Everex Systems, Inc. **(415) 683-2246**	Step 486IS	25	DOS 3.3, 4.01, OS/2, Esix System V	ISA	Built into I486	8K, 64K, expandable to 256K	Proprietary	4M/16M	One 5¼-in. 1.2M	Optional 330M	Everex ESDI	5/0	None	1/1	Two 8-bit, six 16-bit	6 x 21 x 16	$8,999
	Step 486/25	25	DOS 3.3, 4.01, OS/2, Esix System V	ISA	Weitek 4167, built into I486	8K, 128K	Proprietary	4M/64M	One 5¼-in. 1.2M	Optional 330M	Everex ESDI	5/0	None	2/1	One 8-bit, six 16-bit, one 32-bit	6 x 21 x 16	$8,999
	Step 486/33	33	DOS 3.3, 4.01, OS/2, Esix System V	ISA	Weitek 4167, built into I486	8K, 128K	Proprietary	4M/64M	One 5¼-in. 1.2M	Optional 330M	Everex ESDI	5/0	None	2/1	One 8-bit, six 16-bit, one 32-bit	6 x 21 x 16	$10,499
Grid Systems Corp. **(415) 656-4700**	Grid 486EI-25	25	DOS, OS/2, SCO Xenix	EISA	Built into I486	8K	Internal cache only	2M/64M	One 3½-in. 1.44M	Optional 20M/1G	IDE, optional ESDI, SCSI, ST-506	3/0	Super VGA	1/1	Six 32-bit EISA	6.25 x 17 x 15.75	$8,999
Hewlett-Packard Co. **(800) 752-0900**	HP Vectra 486	25	DOS 4.01, OS/2, SCO Unix System V	EISA	Intel 80387, built into I486	8K	Internal cache only	2M/64M	One 5¼-in. 1.2M	Optional 150M/two 670M	ESDI	6/0	Optional VGA, Super VGA, IGC	2/1	Eight 32/16/8-bit EISA	24 x 8.3 x 20	$10,499
IBM **(800) 426-2468**	Personal System/2 Model 70 486	25	DOS 3.3, 4.0, OS/2, SCO Unix/386, AIX PS/2 1.2	MCA	Integrated floating-point unit, built into I486	8K	Internal cache only	2M/16M	One 3½-in. 1.44M	60M/120M	ESDI	3/0	VGA	1/1	One 16-bit, two 32-bit	5.5 x 14.2 x 16.5	$12,390 (60M), $12,990 (120M)
Kontron Elektronik **(408) 733-0272,** **(800) 227-8834**	IP Lite 486 portable industrial computer	25 or 33	DOS 4.0, OS/2, Interactive Systems' Unix System V	EISA, passive backplane	Built into I486	8K	Internal cache only	2M/16M	One 3½-in., 1.44M	40M/200M	SCSI	2/0	VGA	2/1	Five 32-bit-EISA	5 x 15.7 x 18.1	Price unannounced
Logicraft, Inc. **(603) 880-0300**	486Ware	25	DOS 3.3	AT	Built into I486	8K	Internal cache only	4M/16M	One 5.25-in. 1.2M	Optional 179M/702M	ESDI	3/1	CGA, Hercules	2/1	One 8-bit, three 16-bit	6.5 x 21.1 x 16.6	$17,895
Metra Information Systems, Inc. **(408) 730-9188**	MIS 486	25	DOS 4.01	ISA	Weitek 4167, built into I486	8K, 64K	Proprietary	1M/16M	One 5¼-in. 1.2M	43M/600M	IDE	5/0	None	2/1	Eight 16-bit	6 x 21 x 6.5 (desktop), 24 x 7 x 16 (tower)	$3,795 (43M)
	MIS 486/E	25	DOS 4.01	EISA	Weitek 4167, built into I486	8K, 64M	Proprietary	1M/64M	One 5¼-in. 1.2M	43M/600M	IDE	5/0	None	2/1	Eight 32-bit	6 x 21 x 6.5 (desktop), 24 x 7 x 16 (tower)	$4,295 (43M)
Micro Express **(714) 852-1400,** **(800) 642-7621**	ME 486-ISA	25	DOS 3.3, 4.01, Unix	ISA	Weitek 4167, built into I486	8K, 128K	Proprietary	4M/24M	One 5¼-in. 1.2M or one 3½-in. 1.44M	Optional 40M/750M	Any available	6 or 2 half-height and 2 full height	VGA	1/1	One 8-bit, six 16-bit, one 32-bit	22.5 x 7 x 16	$3,999
Mitsuba Corp. **(714) 592-2866**	MIT-486	25	DOS, OS/2, PC-MOS, Microsoft Windows, Xenix, Unix	AT	Weitek 4167, built into I486	8K, 64K	Intel chip set	4M/16M	One 5¼-in. 1.2M or one 3½-in. 1.44M	Optional 40M/330M	DTC 728, DTC 6280	Two 5¼-in., two 3½-in./one 5¼-in. (tower); three 5¼-in./one 5¼-in (AT case)	None	2/1	Two 8-bit, six 16-bit	6 x 21 x 16.5	NP
Mobius Computer Corp. **(800) 662-4871**	PWS/425	25	Interactive Systems' Unix System V	ISA	Weitek 4167, built into I486	8K	Internal cache only	4M/16M	One 3½-in. 1.2M or 1.44M	105M/700M	SCSI	4/0	None	2/1	Two 8-bit, five 16-bit, one 32-bit, one 32-bit burst mode	12 x 7 x 18	$7,995 (105M)
	PWS/425C	25	Interactive Systems' Unix System V	ISA	Weitek 4167, built into I486	8K	Internal cache only	4M/16M	One 3½-in. 1.2M or 1.44M	105M/700M	SCSI	4/0	Mobius workstation graphics system	2/1	Two 8-bit, five 16-bit, one 32-bit, one 32-bit burst mode	12 x 7 x 18	$9,995 (105M)
National Micro Systems, Inc. **(404) 446-0520**	Flash 486-25	25	DOS 4.01	ISA	Built into I486	8K, 128K	Proprietary	4M/16M	One 5.25-in. 1.2M	None	NA	5/0	None	2/1	One 8-bit, six 16-bit, one 32-bit	6.38 x 21.13 x 16.5	$4,499
NCR Corp. **(800) 544-3333,** **(513) 445-5000**	PC486/MC 33	33	DOS, OS/2, Unix	MCA	Weitek 4167, built into I486	8K	Internal cache only	4M/64M	One 3.5-in. 1.44M	100M/320M	SCSI	3/0	Super VGA	1/1	Four 32-bit	5.2 x 15 x 16.6	$14,195-$26,095
	S486/MC 33	33	DOS, OS/2, Unix	MCA	Weitek 4167, built into I486	8K	Internal cache only	4M/64M	One 3.5-in. 1.44M	327M/600M	SCSI	6/3	Super VGA	2/1	Seven 32-bit	29 x 7.25 x 28	$16,195
	PC486/MC	25	DOS, OS/2, Unix	MCA	Weitek 4167, built into I486	8K, 128K	Proprietary	2M/16M	One 3.5-in. 1.44M	100M/200M	SCSI	Three 3.5-in./0	Super VGA	1/1	Four 32-bit	5.2 x 15 x 16.6	$9,995-$16,995
NEC Technologies, Inc. **(508) 264-8000**	Power Mate 486/25E	25	DOS, OS/2, SCO Unix, Microsoft Windows/386	EISA, ISA	Optional Weitek 4167, built into I486	8K, optional 64K	Internal cache and optional proprietary	4M/64M	Five 5¼-in. 1.2M, or optional 1.44M	118M/600M	NEC EISA, SCSI	5¼-in./0	None	2/1	Two 16-bit, six 32-bit	6.3 x 21.2 x 17.7	$12,999 (118M)
	Business Mate 486/25E	25	SCO Unix, Xenix	EISA, ISA	Optional Weitek 4167, built into I486	8K, optional 64K, expandable to 256K	Internal cache and optional proprietary	4M/64M	5¼-in. 1.2M, or optional 1.44M	100M/300M	NEC EISA, SCSI	Three 5¼-in./0	None	2/1	Two 16-bit, six 32-bit	25.6 x 7.1 x 26.8	Price unannounced
Northgate Computer Systems, Inc. **(800) 548-1993**	Elegance/486	25	DOS 4.01	ISA	Weitek 4167, built into I486	8K, 64K, expandable to 256K	Proprietary	4M/16M	One 5¼-in. 1.2M, one 3½-in. 1.44M	200M/1.2G	IDE	5/0 (desktop case), 7/0 (upright case)	VGA	2/1	One 8-bit, six 16-bit, one 32-bit	6.5 x 21 x 16.5 (desktop), 25.25 x 7.5 x 16.25 (upright)	$5,895 (200M)
Novacor, Inc. **(408) 441-6500,** **(800) 486-6682**	Novas Optimum	25 or 33	DOS 3.3, 4.0, 4.01, Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 64K, expandable to 512K	Proprietary	64M	One 5¼-in. 1.2M, one 3½-in. 1.44M	100M/676M	Western Digital AT-240, Adaptec 2223B-8	6/2	Super VGA	2/1	Two 8-bit, six 16-bit, one 32-bit	24 x 7.5 x 16	$3,995 (100M)
Otec Technologies, Inc. **(800) 346-2799**	OTC 486-25X	25	DOS 3.3, 4.01, Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 128K	Proprietary	4M/24M	One 5¼-in. 1.2M	Optional 40M/600M	ESDI, MFM	5/2	None	2/1	Two 8-bit, six 16-bit, one 32-bit	5.5 x 21 x 16.5	$6,295
	OTC 486-25C	25	DOS 3.3, 4.01, Unix, Xenix	ISA	Intel 80387, Weitek 4167, built into I486	8K, 64K	Proprietary	4M/16M	One 5¼-in. 1.2M	Optional 40M/600M	ESDI, MFM	5/2	None	2/1	Two 8-bit, six 16-bit, one 32-bit	5.5 x 21 x 16.5	$4,995

As Fast As
And You Can

It Gets. Get It Fast.

The NCR PC486/MC is one fast machine. *PC/Computing* reports "the PC486/MC is on the front edge" of 486 desktops.* With its dual high-speed cache design, the system takes full advantage of the performance potential of the i486™ microprocessor. And its implementation of Micro Channel™ architecture makes it the clear leader in providing full 32-bit performance.

According to *BYTE* Lab benchmarks, the PC486/MC's "mass storage subsystem (with a 100MB SCSI hard drive) turned in the fastest performance we've ever measured."*

Standard Features

i486 Native Design
▪
Micro Channel Architecture
▪
128KB Of High-Speed Cache Memory
▪
SuperVGA Display Adapter
▪
Small Computer System Interface (SCSI) Multi-Peripheral Controller
▪
Worldwide Service and Support
▪
Available *Now*

Our PC is the only native design 486 Micro Channel machine from a major vendor now available. We've not only released it for sale, we're delivering it in volume. The competition will eventually release a native-design 486. But how long will it be before they can deliver?

The PC486/MC is ideal for MIPS-hungry applications like large spreadsheets, financial modeling, simulations, CAD, and networking.

It's the first of a family of advanced PCs that will lead the market in speed, power, and availability.

Our PC family also includes high-performing 286™ and 386™-based PCs. Backed by the resources of a $6 billion computer company with service and support in nearly every country in the world. And a commitment to quality that is unequaled.

Call 1 800 544-3333 for a free six-page 486 PC comparison brochure. We'll also put you in touch with the NCR or Businessland representative, or other Authorized NCR Reseller nearest you.

NCR

Open, Cooperative Computing.
The Strategy For Managing Change.

NCR is the name and mark of NCR Corporation. Micro Channel is a trademark of IBM Corporation. 486, 386, and 286 are trademarks of Intel Corporation. *Sources: *PC/Computing*, March 1990. *BYTEWEEK*, 11/13/89. © 1990 NCR Corporation.

COMPANY	PRODUCT NAME	CLOCK SPEED (MHz)	OPERATING SYSTEMS SUPPORTED	BUS ARCHITECTURE	COPROCESSOR SUPPORT[1]	MEMORY CACHE[2]	CACHE CONTROLLER	RAM: STANDARD/MAXIMUM	FLOPPY DRIVE	HARD DRIVE: STANDARD/ MAXIMUM	CONTROLLER	STORAGE BAYS: HALF HEIGHT/ FULL HEIGHT	GRAPHICS STANDARD	NUMBER OF SERIAL/ PARALLEL PORTS	NUMBER AND TYPE OF EXPANSION SLOTS	DIMENSIONS (IN.)	PRICE
Spear Technology, Inc. **(708) 480-7300**	Super 486/25	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA, EISA	Weitek 4167, built into I486	8K, 128K	Proprietary	1M/24M	One 5.25-in. 1.2M	72M/766M	MFM, RLL, ESDI, SCSI	3/1	VGA	2/1	Two 8-bit, six 16-bit, one 32-bit	24.5 x 7.5 x 16.75	$5,195 (150M)
Swan Technologies **(800) 468-9044**	Swan 486/25	25	DOS 4.01	ISA	Socket for Weitek 4167, built into I486	8K, 64K, expandable to 256K	Proprietary	4M/16M	One 5¼-in. 1.2M, one 3½-in. 1.44M	Optional 110M/660M	SCSI, Adaptec 1542A	5/2	Optional Super VGA	2/1	Eight 16-bit	6.5 x 21 x 16.5	$4,499
Symbionics, Inc. **(512) 858-4986**	SYM48625C	25	DOS 3.3, 4.01, PCMOS, OS/2, SCO Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 128K	Proprietary	1M/16M	One 5¼-in. 1.2M	Optional 80M/unlimited	Any available	6/0	Optional monochrome, Super VGA	2/1	Two 8-bit, five 16-bit, one 32-bit	6 x 19 x 16 (desktop), 28 x 6.5 x 17 (tower)	$3,359, $4,955, (105M)
Syntrex, Inc. **(201) 542-1500**	Syntrex 486/33C	33	DOS 3.3, 4.01, Unix System V	ISA	Built into I486	8K, 128K	Intel chip set	4M/32M	One 5¼-in. 1.2M	Optional 150M/four 660M	ESDI, SCSI, DCB, proprietary mirrored disk controller	3/4	None	4/2	One 8-bit, nine 16-bit	24.5 x 15 x 22	$15,999 (150M)
	Syntrex 486/25C	25	DOS 3.3, 4.01, Unix System V	ISA	Built into I486	8K, 128K	Intel chip set	4M/32M	One 5¼-in. 1.2M	Optional 150M/four 660M	ESDI, SCSI, DCB, proprietary mirrored disk controller	3/4	None	4/2	One 8-bit, nine 16-bit	24.5 x 15 x 22	$14,999 (150M)
Systems Integration Associates **(312) 440-1275**	SIA Model 486/25C (convertible)	25	DOS 3.3, OS/2, SCO Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 64K	Proprietary	4M/16M	One 5¼-in. 1.2M	90M/1.2G	2322 B	10/or 5	None	1/1	One 8-bit, six 16-bit, one 32-bit	6.5 x 21 x 16.5	$6,561 (90M)
	SIA Model 486/25	25	DOS 3.3, OS/2, SCO Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 128K	Proprietary	4M/24M	One 5¼-in. 1.2M	150M/1.2G	2322 B	10/or 5	None	1/1	One 8-bit, six 16-bit, one 32-bit	24.5 x 9 x 23.5	$8,690 (150M)
	SIA Model 486/25E	25	DOS 3.3, OS/2, SCO Unix, Xenix	EISA	Weitek 4167, built into I486	8K, 256K, expandable to 512K	Proprietary	4M/96M	One 5¼-in. 1.2M	150M/1.2G	2322 B	10/or 5	None	1/1	One 8-bit, one 32-bit, six 32-bit EISA	24.5 x 9 x 23.5	$9,866 (150M)
	SIA Model 486/33C (convertible)	33	DOS 3.3, OS/2, SCO Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 64K	Proprietary	4M/16M	One 5¼-in. 1.2M	150M/1.2G	2322 B	10/or 5	None	1/1	One 8-bit, six 16-bit, one 32-bit	24.5 x 9 x 23.5	$8,801 (150M)
	SIA Model 486/33	33	DOS 3.3, OS/2, SCO Unix, Xenix	ISA	Weitek 4167, built into I486	8K, 128K	Proprietary	4M/24M	One 5¼-in. 1.2M	150M/1.2G	2322 B	10/or 5	None	1/1	One 8-bit, six 16-bit, one 32-bit	24.5 x 9 x 23.5	$10,454 (150M)
	SIA Model 486/33E	33	DOS 3.3, OS/2, SCO Unix, Xenix	EISA	Weitek 4167, built into I486	8K, 256K, expandable to 512K	Proprietary	4M/96M	One 5¼-in. 1.2M	150M/1.2G	2322 B	10/or 5	None	1/1	One 8-bit, one 32-bit, six 32-bit EISA	24.5 x 9 x 23.5	$11,043 (150M)
Tandon Corp. **(805) 523-0340**	Tandon 486	25	DOS 4.01, OS/2, Unix System V	EISA	Weitek 4167, built into I486	8K, 64K	Proprietary	2M/64M	One 5¼-in. 1.2M	Optional 110/670M	IDE, SCSI	5/2	Optional Super VGA	2/1	Two 16-bit, six-32-bit EISA	6.3 x 21.1 x 16.3	$6,599 (110M)
Tatung Co. of America, Inc. **(213) 979-7055**	TCS 9270	25	DOS, OS/2, Unix, Xenix	MCA	Intel 80387-compatible, built into I486	8K, 64K	Faraday chip set	4M/64M	One 5¼-in. 1.2M	Optional 100M	ESDI	3/1	VGA	2/1	One 16-bit, three 32-bit	6.38 x 21.25 x 17.32	$6,400
	TCS 9600E	25	DOS, OS/2, Unix, Xenix	EISA	Weitek 4167, Intel 80387, built into I486	8K, 64K, expandable to 128K	Intel chip set	2M/64M	One 5¼-in. 1.2M	Optional 100M	SCSI	3/1	VGA	2/1	One 16-bit, three 32-bit	6.38 x 21.25 x 17.32	$6,500
Telecad (Div. of DMS) **(415) 352-9322**	Rocket 486	25	DOS 3.3, 4.01, OS/2, Unix, Xenix	ISA	Weitek 4167, Intel 80387, built into I486	8K, 64K, expandable to 256K	Proprietary	8M/16M	One 5¼-in. 1.2M	330M/660M	ESDI	5/0	None	2/1	Eight 16-bit	24.75 x 16 x 7 (tower)	$8,299 (330M)
Televideo Systems, Inc. **(408) 954-8333**	Tele 486	25	DOS 4.01	EISA	Weitek 4167, built into I486	8K, optional 64K, expandable to 256K	Proprietary	4M/64M	One 5¼-in. 1.2M or 3½-in. 1.44M	Optional 110M/320M	SCSI	5/1	VGA, optional Super VGA	2/1	Seven 32-bit EISA/ISA	6.4 x 16.5 x 16.5 (desktop)	$8,995
	Tele 486 TE	33	DOS 4.01	EISA	Weitek 4167, built into I486	8K, optional 64K, expandable to 256K	Proprietary	4M/64M	One 5¼-in. 1.2M	Optional 320M	SCSI	3/2	VGA, optional Super VGA	2/1	Seven 32-bit EISA/ISA	25.6 x 17.8 x 7.5 (tower)	$10,995
TMC Research Corp. **(408) 262-0888**	Vantage 425 Model 200	25	DOS, OS/2, SCO Unix, Microsoft Windows/386	ISA	Built into I486	8K, 128K	Proprietary	4M/16M	One 5¼-in. 1.2M and one 3½-in. 1.44M	200M/300M	IDE	2/or 1	VGA	2/1	One 8-bit, five 16-bit, two 32-bit	6.5 x 21 x 17	$4,966 (200M)
Tricord Systems, Inc. **(612) 557-9005**	Powerframe Model 30, Model 40	25	OS/2, SCO Unix	EISA	Built into I486	8K (Model 30), 64K (Model 40)	Proprietary	8M/256M	One 5¼-in. 1.2M	380M/16G	SCSI	4/10	VGA	2/1	Seven 8-bit, seven 16-bit, seven 32-bit	30 x 20 x 27	$27,900 (Model 40, 380M), $22,300 (Model 30, 380M)
Twinhead Corp. **(408) 945-0808**	Superset 600/425	25	DOS 4.01	ISA	Weitek 3167, built into I486	8K, 64K	Proprietary	4M/16M	One 5¼-in. 1.2M	100M/two 300M	IDE	Two 1/3 height, one 5¼-in., one 3½-in.	Super VGA	2/1	Four 16-bit, two 32-bit	5.1 x 15.7 x 15.7	$6,995 (100M)
Unisys Corp. **(800) 448-1424**	PW^2 800/486-25A	25	DOS 4.01	ISA	Built into I486	8K	Internal cache only	8M/32M	One 3½-in. 1.44M	140M/640M	SCSI	5/0	VGA	2/1	One 8-bit, three 8/16-bit, four 8/16/32-bit	21 x 6.5 x 19 (tower)	$13,499 (140M)
V.I.P.C. **(415) 881-1772**	VIPC 486-25	25	DOS 3.3, 4.01, SCO Unix	AT standard, optional EISA	Weitek 4167, built into I486	8K, 256K	Proprietary	1M/16M	One 5¼-in. 1.2M	80M/1.2G	ESDI, Western Digital	10/or 5	None	2/2	Eight 16-bit	24 x 23 x 9	$3,999
Wave Mate, Inc. **(213) 533-8190**	Bullet-486	25	DOS, Unix	EISA, ISA	Weitek 4167, built into I486	8K, 64K, expandable to 256K	Intel chip set	4M/64M	One 5¼.-in. 1.2M, one 3½-in. 1.44M	Any size available	Any available	0/8	None	2/1	One 8-bit, seven 16/32-bit	6 x 16 x 14, tower model also available	$4,990

The delicate art of being credible

Honesty and a service focus win points with bosses, workers and users

BY WILLIAM HARRIS
and SUSAN BEHNKE

With the high turnover in information systems management these days, IS executives should be striving to protect their reputations.

It's time to learn the delicate art of staying credible.

Savvy IS managers already know this survival skill or are learning it. Unfortunately, many companies that have reorganized have diminished IS authority — or will do so soon. Reduced authority, of course, is the last thing that a chief information officer wants: It's tantamount to being fired. It's also proof that the IS manager has ignored the signs of waning credibility (see story page 100).

To some degree, knowing how to build and protect a reputation is intuitive. Some IS managers just seem to always know what to do and when to do it. But it's also true that IS managers can *learn* how to be credible. The secret is to ask (and honestly answer) some key questions.

Make no mistake: The process of building credibility is difficult. Being objective is hard, which is one reason for characterizing the art of staying credible as delicate. But credibility can make the difference between a brilliant IS career and mediocrity — or worse.

Before proceeding, you'll need to know a few things. First, you'll need a decent understanding of your corporation and its politics. You'll also need a good understanding of IS services — past and present — and relationships with outside vendors. And finally, you'll need to know about the personalities and politics involved in delivering and maintaining IS services.

In this process, it's especially important to view your users as customers. One good way to do this is by pretending that you are an outside consultant evaluating your organization. The discovery procedures and analyses used by consultants can be a great help in providing perspective on your situation.

Step 1: In-depth evaluation

After looking over the warning signs and applying them to your own situation, it's time for a second, more in-depth evaluation that focuses on a few key tasks:

- **Defining the overall operational philosophy of the IS organization.** Is it dictatorial? User participative? Leadership-oriented and innovative? Reactive? Does IS carry out changes for executive management?
- **Determining organizational differences between IS and users.** Are they centralized? Decentralized? One centralized and the other decentralized? Do these similarities or differences cause conflicts?
- **Quantifying the allocation of IS resources among various user groups.** Who gets more? Less? What is the quality of resources assigned to different groups?
- **Determining expectations.** How are users' expectations of IS performance established? How are these expectations communicated to the corporation?
- **Seeing how IS interacts with users.** What are the people-to-people contacts? What are the contexts for their interaction? What "sales" documents are used by IS? What reports are issued? What are the interpersonal capabilities of IS representatives involved in user contacts?
- **Understanding user dissatisfaction.** How is unhappiness manifested? What impact does this dissatisfaction have on IS activities and productivity?
- **Comparing IS with other service organizations.** Do users believe that other staff or outside vendor firms are better at delivering their services than IS? If so, why? What do these groups do that IS does not?

Linda Scharf

- **Obtaining IS opinions.** Which IS staff member should be asked for perceptions on problems in the department?

Step 2: Data evaluation

The next step in correcting problems and building credibility is to closely examine the data on users' dissatisfaction and organize findings that can be converted into action. Some possible categories:

- **Developmental projects.** Such projects may exceed cost and time budgets, produce

---

Harris and Behnke are principals at Behnke Harris & Associates, Inc., a New York/Atlanta consultancy specializing in credibility building and integrating information technology with business strategies.

……

- **Credibility *can* be learned**
- **Asking the right questions is key**
- **Opportunities abound**

systems that do not match requirements or impose more change than users can handle. Problems may develop when users keep changing their specifications and IS cannot hit the moving target. Difficulties may also arise from inadequate user training on new systems.

- **Computer processing and network services.** Common problems are too much downtime, late fixes when things go wrong, numerous recurring problems, unresponsive IS people (including the help desk), hard-to-use or inadequate end-user tools, late reports or negotiated performance contracts not fulfilled by IS.
- **Work effort prioritization process.** Mechanisms for prioritizing and defining development and maintenance efforts may be inadequate or lacking. Prioritization efforts may not be communicated well through user ranks, or mechanisms for prioritizing maintenance requests may be missing. Often lacking is a mechanism for appeasement of users whose requests are rejected.
- **Inadequate backup.** Computers or networks may have become inoperable because backups don't exist. The loss of skilled personnel may delay or impair development or maintenance activities, and IS management may have proven itself inadequate in handling a vendor during emergency recovery and cooperative efforts.
- **Conflicting corporate policies.** This is a tricky area. IS may be the sole provider of its services. In contrast, users can go outside for services offered by other company departments. IS may have full chargeback, while other departments do not. Or the chief executive officer may be using IS as a point man in attempts to change corporate organization or culture.
- **IS organizational and people sensitivity.** IS personnel may be seen as dictatorial and wanting too much control. They may be seen lacking a sales orientation and understanding of the business they are serving. They also may be seen as unenthusiastic about educating users.
- **User/customer understanding of IS.** Besides inadequate performance, IS faults may involve several other factors. Among them are a lack of appreciation of IS costs or benefits, insufficient commitment to the benefits by the users, a failure to comprehend the overhead or full life-cycle costs of IS and former IS staffers who as users second-guess the IS department. Another frequent failing is the lack of a post-implementation measurement of the value of a new IS setup.
- **The IS organization itself.** It may not be positioned properly within the company, may be improperly organized to serve its users or may not have the right people in the right positions.
- **IS infrastructure.** Shortfalls here may involve such matters as appropriate controls, workable standards, policies and methodologies and adequate tools to ensure that IS can operate effectively.

Step 3: Action

Once the detailed evaluation is complete, it's time to develop credibility improvement recommendations and plans for implementing them. If these ideas seem unfamiliar, it could be a sign that new directions are in order.

Here's a good starting list of areas that provide opportunities for credibility improvement:

- **Organizational.** Including prioritization problems, development and maintenance shortfalls, funding or resource allocation problems among users and other matters.

Tactic: Redefine IS functional responsibilities and authority to ensure that necessary activities are not overlooked and are performed by the appropriate personnel (for example, establishment of IS sales, marketing and product development functions).

Tactic: Educate IS management and staff so they understand the business, company culture and politics as well as sales and marketing vis-a-vis selling IS to other departments.

Tactic: Exploit training opportunities in several areas. Educate IS about trends in the use of information technology and train IS and general management on the necessity of integrating IS and business planning. Executive management should be trained in the understanding and involvement in IS. Users also should be trained to understand IS, especially the systems development and implementation processes.

- **Managerial.**

Tactic: Establish a comprehensive management information and control program for the use of IS management.

Tactic: Adopt the philosophy that IS should be run like a business. Establish a formal marketing and sales function, with personnel skilled in sales acting as user representatives. Work with customer service and sales performance criteria for employee evaluation and rewards.

- **Operational.**

Tactic: Install and use appropriate standards, methodologies, control, quantitative analysis activities, etc., to help improve development, maintenance and operational performance.

ONCE THE detailed evaluation is complete, it's time to develop credibility improvement recommendations and plans for implementing them.

Tactic: Install new hardware or software to improve IS operational capability.

Tactic: Acquire staff with the right skills.

Tactic: Provide additional training of existing IS personnel.

Tactic: Use "customer appeasement" methods where appropriate; that is, a fast-response maintenance/enhancement team that allows users to go outside or get their own equipment until IS can support them.

Tactic: Adopt a marketing or public relations program involving the use of "annual reports," "quarterly reports" and special reports with respect to performance issues. The purpose of these is to recognize and reinforce positive performances.

All these suggestions flow from a basic but all-important reality: IS is a service business and should operate like one. Cultivating a service mentality is the single most important ingredient in staying credible. •

How do you stay credible?

Mark W. Sullivan
Department Manager, Assistant Vice-President
First Interstate Bank of Washington
Seattle

You build credibility by staying current, reading various periodicals, participating in various seminars and keeping in touch with others in the industry. You need to live up to commitments and deliver products if you say you are going to. With employees, it's important to be honest and admit when you don't know something.

Thomas Cimino
Senior Vice-President of Information Services
Great American Life Insurance Co.
Los Angeles

First and foremost, you must not overcommit — do what you say you are going to do, and do it on time. You also need to demonstrate an understanding of business needs — speak a common language. It's also important to demonstrate your own expertise, to come up with the right answers before the questions are even asked.

You've got to show employees a willingness to work with them on their problems, to roll up your sleeves. You need to recognize and expect that there will be mistakes and not punish [people] when they occur. You always acknowledge when a job gets done and is done well.

Timothy A. Kenney
Manager of Information Services
Systemetrics/McGraw Hill
Santa Barbara, Calif.

The best way to stay credible is by maintaining a high level of service and communication and letting people know that you appreciate their business. You've got to understand that there is a never-ending goal to meet other people's needs and know their needs.

With employees, constant communication is key. So is committing to things and sticking to these commitments. You also need to hire qualified staff members and help out employees with their needs; for example, providing training and better equipment.

Michael Simmons
Executive Vice-President of Technical Operations
Bank of Boston
Boston, Mass.

You need to be able to deliver products and services as indicated and the way people would like them. I never use force when not necessary. Have a clear understanding of problems, be open and honest and admit when a problem arises. You've also got to have confidence in your team's ability. You must be aware of everyone on your team and their abilities.

Michael Farrell
Vice-President of Systems
Automatic Business Centers
Moorestown, N.J.

Deliver on time and tell them you will deliver on time — the message is more important then the fact. You need to meet your goals. Do your job and do it well — and let people know that you did it well.

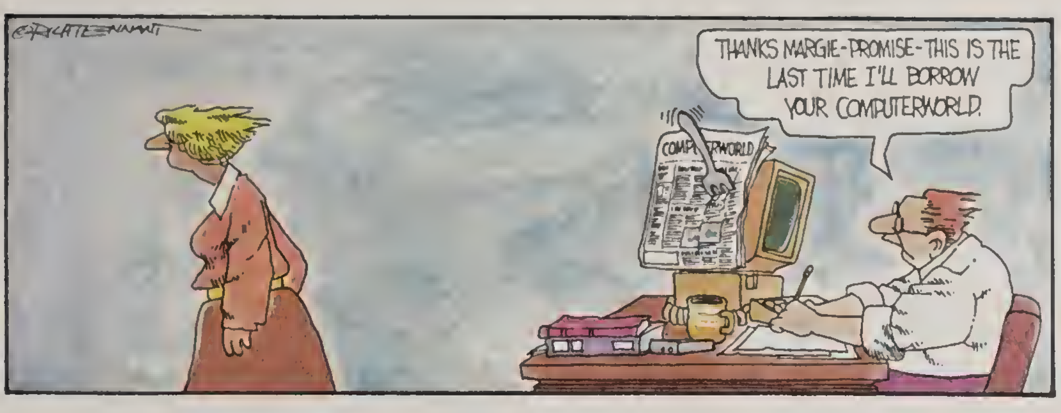
STEFANIE MCCANN

Warning signs for IS

Is your credibility waning? Look for some of the following warning signs:

- You have met business objectives (or feel that you've met them), but you have not received appropriate recognition.
- Others (users, chief executive officers, executive management, external customers of the firm, etc.) perceive that the information technology function is providing substandard service.
- Executive management is unhappy about the support the IS department is providing in terms of strategic use of information technology to bolster business and increase user and external customer productivity.
- You are receiving unsatisfactory support from an immediate superior, the executive steering committee or other key executives.
- The technology plan and corporate business plan are not well integrated.
- You are unable to sell executive management on appropriate budget levels, staffing and projects.
- You or your boss are dissatisfied with the marketing, customer service and business orientation of information technology staff.
- Hardware and software changes disrupt user activities.
- The turnover in the IS department is unacceptably high — and accelerating.
- Recent projects involving outside consultants resulted in impractical solutions, costly overruns, demoralized IS staff members and severe political problems for the chief information officer.
- Data center performance in terms of uptime, response time, change management, currency of hardware and software or other management criteria is inadequate.

WILLIAM HARRIS AND
SUSAN BEHNKE


THANKS MARGIE-PROMISE-THIS IS THE LAST TIME I'LL BORROW YOUR COMPUTERWORLD.
COMPUTERWORLD

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44.00* per year — a savings of 57% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1 **BUSINESS/INDUSTRY** (Circle one)
- **10.** Manufacturer (other than computer)
- **20.** Finance/Insurance/Real Estate
- **30.** Medicine/Law/Education
- **40.** Wholesale/Retail/Trade
- **50.** Business Service (except DP)
- **60.** Government - State/Federal/Local
- **65.** Communications Systems/Public Utilities/Transportation
- **70.** Mining/Construction/Petroleum/Refining/Agric.
- **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
- **85.** System Integretors, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- **90.** Computer/Peripheral Dealer/Distr./Retailer
- **75.** User: Other ____________
- **95.** Vendor: Other ____________

(Please specify)

2. **TITLE/FUNCTION** (Circle one)

IS/MIS/DP MANAGEMENT
- **19.** Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- **21.** Dir./Mgr. MIS Services, Information Center
- **22.** Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
- **23.** Dir./Mgr. Sys. Development, Sys. Architecture
- **31.** Mgrs., Suprv. of Programming, Software Dev.
- **32.** Programmers, Software Developers
- **60.** Sys. Integretors/VARs/Consulting Mgt.

OTHER COMPANY MANAGEMENT
- **11.** President, Owner/Partner, General Mgr.
- **12.** Vice President, Asst. VP
- **13.** Treasurer, Controller, Financial Officer
- **41.** Engineering, Scientific, R&D, Tech. Mgt.
- **51.** Sales & Mktg. Management

OTHER PROFESSIONALS
- **70.** Medical, Legal, Accounting Mgt.
- **80.** Educator, Journalists, Librarians, Students
- **90.** Others ____________

(Please specify)

3 **COMPUTER INVOLVEMENT** (Circle all that apply)
Types of equipment with which you are personally involved either as a user, vendor, or consultant.
- **A.** Mainframes/Superminis
- **B.** Minicomputers/Small Business Computers
- **C.** Microcomputers/Desktops
- **D.** Communications Systems
- **E.** Local Area Networks
- **F.** No Computer Involvement

E4025-0

THANKS MARGIE-PROMISE-THIS IS THE LAST TIME I'LL BORROW YOUR COMPUTERWORLD.
COMPUTERWORLD

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44.00* per year — a savings of 57% off the single copy price.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48 per year

* U.S. Only. Canada $110, Central/South America $130, Europe $195, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
- **10.** Manufacturer (other than computer)
- **20.** Finance/Insurance/Real Estate
- **30.** Medicine/Law/Education
- **40.** Wholesale/Retail/Trade
- **50.** Business Service (except DP)
- **60.** Government - State/Federal/Local
- **65.** Communications Systems/Public Utilities/Transportation
- **70.** Mining/Construction/Petroleum/Refining/Agric.
- **80.** Manufacturer of Computers, Computer-Related Systems or Peripherals
- **85.** System Integretors, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- **90.** Computer/Peripheral Dealer/Distr./Retailer
- **75.** User: Other ____________
- **95.** Vendor: Other ____________

(Please specify)

2 **TITLE/FUNCTION** (Circle one)

IS/MIS/DP MANAGEMENT
- **19.** Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- **21.** Dir./Mgr. MIS Services, Information Center
- **22.** Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr. PC Resources
- **23.** Dir./Mgr. Sys. Development, Sys. Architecture
- **31.** Mgrs., Suprv. of Programming, Software Dev.
- **32.** Programmers, Software Developers
- **60.** Sys. Integretors/VARs/Consulting Mgt.

OTHER COMPANY MANAGEMENT
- **11.** President, Owner/Partner, General Mgr.
- **12.** Vice President, Asst. VP
- **13.** Treasurer, Controller, Financial Officer
- **41.** Engineering, Scientific, R&D, Tech. Mgt.
- **51.** Sales & Mktg. Management

OTHER PROFESSIONALS
- **70.** Medical, Legal, Accounting Mgt.
- **80.** Educator, Journalists, Librarians, Students
- **90.** Others ____________

(Please,specify)

3 **COMPUTER INVOLVEMENT** (Circle all that apply)
Types of equipment with which you are personally involved either as a user, vendor, or consultant.
- **A.** Mainframes/Superminis
- **B.** Minicomputers/Small Business Computers
- **C.** Microcomputers/Desktops
- **D.** Communications Systems
- **E.** Local Area Networks
- **F.** No Computer Involvement

E4025-0

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

COMPUTER INDUSTRY

NATIONAL

BRIEFS

In time for Flag Day

Cypress Semiconductor Corp. has planted the Stars and Stripes in the Soviet semiconductor market. Cypress Chief Executive Officer T. J. Rodgers is off to Zelenograd — the so-called Silicon Valley of the USSR — next month to discuss details of the technologies expected to emerge from the recently inked licensing pact under which his San Jose, Calif.-based firm will acquire certain manufacturing technologies and semiconductor manufacturing licenses from the Soviet Union's **International Center for Informatics and Electronics.**

....

Money in the door

Embattled supercomputer firm **FPS Computing** (formerly Floating Point Systems, Inc.) signed a preliminary agreement last week, which was expected to result in a $14.5 million investment by an institutional investor. President Howard Thrailkill credited the scientific/technical user community's warm reception of FPS' Model 500EA Unix-based line with attracting the as-yet-unnamed investor. The money, he said, will be used to reduce debt and expand production and marketing.

More briefs on page 110

Chalk one up for Tally Systems

Software firm fills overlooked niche with PC Census, an inventory management tool

BY CLINTON WILDER
CW STAFF

Tally Systems Corp. has all the entrepreneurial earmarks of a software start-up from the go-go days of the early 1980s.

A huge list of "Things to Do" scrawled with a Magic Marker flows across three panels in a conference room, where bearded software engineers in chamois shirts exchange strategies with business-suited marketing types. Still, it's never so intense that the president can't spare a few moments for a scoop of Rainforest Crunch ice cream at the Ben & Jerry's store down the street.

From its peaceful A-frame headquarters in bucolic Hanover, N.H., Tally Systems hopes to grow by helping corporate information systems departments do their dirty work. Its software product, PC Census, automates the task of maintaining inventory of DOS-based personal computers throughout an organization — their model numbers, microprocessors, add-in boards and software. For PC and information center managers, that task is thankless, time-consuming — and often neglected altogether.

"Our competition," Tally Systems President Ted Jastrzembski said, "is a screwdriver and lots of interns in the summer."

The early 1990s are hardly the best of times for embryonic high-tech firms, but Tally Systems officials said they believe that PC Census has found an overlooked niche. "MIS has been doing data center management for years," director of marketing Tom Cecere said. "As PCs become legitimate contenders for processing, managing those should be given the same attention."

Up and Coming: *Tally Systems Corp.*

"Our competition is a screwdriver and lots of interns in the summer."

....

- **Location:** Hanover, N.H.
- **Incorporated:** 1990 as Tally Systems; 1972 as DTSS
- **President:** Ted Jastrzembski
- **Employees:** 15
- **Product line:** PC-based software for automated inventory of PC hardware and software in organizations

PC Census sells at a price point that PC managers can sign for without higher-up budget clearance, according to Jastrzembski. The combined hardware and software tracking modules sell for $7.50 to $12 per PC, depending on the size of the customer site, with a minimum of 50 PCs.

Tally Systems is brand-new in its present incarnation, but its roots go back 26 years to a joint research project between then-computer vendor General Electric Co. and the computer department at nearby Dartmouth College. That project developed the Dartmouth Time-Sharing System (DTSS) operating system for GE's computer line (later sold to Honeywell, Inc.). DTSS, Inc. was incorporated in 1972.

Metropolitan Life Insurance Co. acquired DTSS as a wholly owned subsidiary in 1978. DTSS developed close ties to Met Life's IS department, with Senior Vice-President of IS Daniel Cavanagh on its board and the IS shop serving as a test bed for DTSS products.

Jastrzembski, after a career at software firms Comshare, Inc., Thorn EMI Computer Services, Inc. and market research firm International Data Corp., joined DTSS in 1987. In the late 1980s, when DTSS sought to diversify the business, PC Census was born — albeit quite by accident.

DTSS was researching the market for an ambitious product that would distribute PC software from central hosts.

"We thought of the PC tracking module as just a small component of the whole system," Cecere said. "But Ted and I would get in the elevator after a customer visit, look at each other and say, 'Did you see them jumping out of their seats when we talked about that?' "

DTSS decided to shelve its other plans and concentrate on PC Census, which debuted in the market in 1989. Earlier this year, DTSS management purchased PC Census and other assets of the company from Met Life and set up operations as Tally Systems.

The newly independent Tally is small, with 60 customers in the U.S. and Canada and projected revenue of $1 million to $2 million this year. Jastrzembski said he believes the firm can

Continued on page 103

INFOMART FROM JANUARY TO DECEMBER.

INFOMART is where you can see and evaluate the latest in information and communications technology. It's also home to a year-round schedule of conferences and seminars designed to keep you up to date on the latest technology.

Call today to get your free INFOMART schedule of events. It's the easy way to make your visit to INFOMART even more productive.

Call today to get your free schedule of events. 1-800-232-1022

INFOMART®
Where the leaders in automation share their knowledge with you.

INFOMART 1950 Stemmons Freeway, Dallas, Texas 75207 INFOMART is a registered servicemark of IFM partnership

KEEP THIS TO YOURSELF.

Computerworld is not the kind of publication you can afford to share with every person on your company's routing list.

Especially if it's in alphabetical order and your name begins with X, Y, or Z.

That's why you need your own subscription. So you'll be among the first in your company to get the most important news in the IS industry — hot off the press.

Order *Computerworld* now and you'll receive 51 information-packed issues. Plus you'll get our special bonus publication, *The Premier 100*, an annual profile of the top companies using information systems technology.

Each week *Computerworld* is filled cover to cover with up-to-the-minute articles on topics ranging from products and people to trends and technology. It's everything IS professionals like you need to know to get an edge on the competition.

However, you certainly don't want to share your copy with anyone in your office. Let alone that certain know-it-all who always beats you to *Computerworld.*

So why not use the postage-paid subscription card bound into this issue to order your own copy. Then keep it to yourself.

The Newsweekly of Information Systems Management

Tally

FROM PAGE 101

double in size next year — an ambitious plan, but one he said is reachable because of the need that the product meets.

"The challenge is making people aware that this is out there and then being there when they realize they need a PC inventory," he said.

Tally Systems hopes to find a lot more customers like Glenn Katz, who heads PC support at Leviton Manufacturing Co., a privately held maker of electronic lighting devices in Little Neck, N.Y. Before installing PC Census five months ago to track 300 PCs in 14 locations, "we had no idea what was out there," Katz said. "When we inputted the inventory data, it was never consistent. It took me three months just to clean up the database."

Katz said the product also helps him support users. "The next time they call and say they can't get Lotus 3.0 to run, I tell them to check their inventory tag," he said. "Sure enough, their machine doesn't have enough memory."

In addition to PC managers in business and government, Tally Systems is courting business-oriented resellers such as Egghead Discount Software.

There, too, the biggest challenge is marketing. "We could rely on the [third-party] channel, but we have to create the opportunities ourselves to get the thing rolling," Jastrzembski said. PC Census "is something different. It's not another word processor or spreadsheet," he added.

A PC Census diskette inserted into a PC automatically reads the configuration of that unit, printing out an inventory of disk drives, I/O ports, graphics adapter boards — whatever is installed. Tally Systems' recently introduced software inventory module does the same for software, from the operating system to applications to Microsoft Corp. Windows 286.

"What I like about this product is it's very nonsexy," said E. Anne Gunn, director of field services. "It does a grungy, grunt work-type job, even though the technology behind it is mind-boggling."

Tally Systems is betting its New Hampshire farm on the premise that PC managers, tired of glitzy new solutions in search of a problem, will snap up grungy, grunt work software that meets a need.

"I haven't seen any software like this before," Katz said. "If it wasn't for this, I'd just resign myself to not knowing what's out there. If they market it right and exploit that, I think they can be really successful."

EXECUTIVE CORNER

AMD names new officer

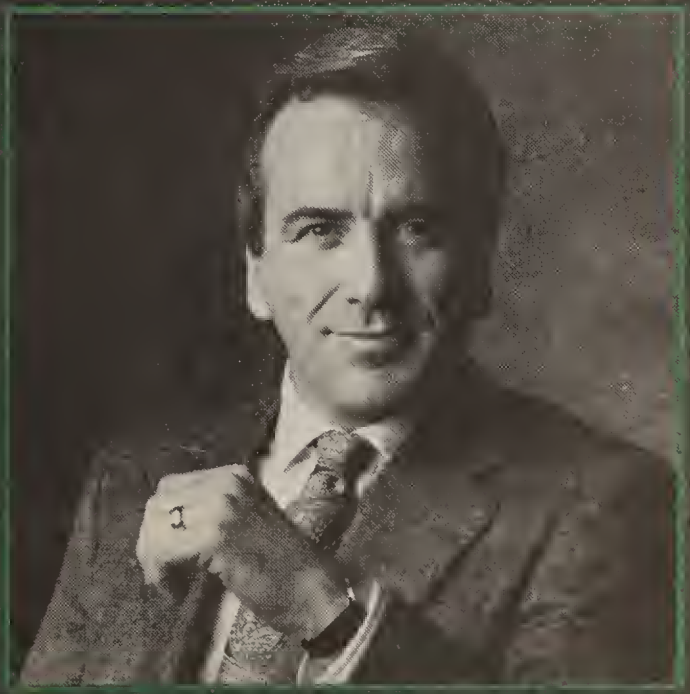
Richard Previte is the new president and chief operating officer of Sunnyvale, Calif.-based **Advanced Micro Devices, Inc.** The 55-year-old Previte, a longtime Advanced Micro veteran, has also been elected to the firm's board of directors. Together with Chief Technical Officer **Anthony Holbrook** and company Chairman and Chief Executive Officer **W.J. Sanders III**, Previte holds the recently created Advanced Micro office of the chief executive.

Cambridge, Mass.-based international management consulting firm **Index Group, Inc.**, a business unit of **Computer Sciences Corp.**, recently named Senior Vice-President **Adam D. Crescenzi** its new managing director of European operations. Crescenzi, who will be responsible for the full sweep of projects handled through the burgeoning 5-year-old London-based headquarters, succeeds **Ronald Mackintosh**, who is now chief executive of UK operations at **CSC Consulting**.

Waynesboro, Va.-based computer printer maker **Genicom Corp.** has a new president and CEO, 22-year IBM veteran **Paul T. Winn**. Winn, 43, most recently served as vice-president of graphics systems in IBM's Advanced Work Station Division.

COME AND SEE US AT
PC EXPO BOOTH 1222

"WITH KELLY COMPUTER TEMPORARIES, WE GET PROFESSIONALS WHO GET THE JOB DONE WITH ACCURACY."



"From programming to data entry, Kelly assigns us people they know can do the job. That saves us time and money. Kelly is the best."

KELLY Temporary Services

©1989 Kelly Services, Inc.

The Kelly Girl® People – The First and The Best®

INDUSTRY INSIGHT

Richard Pastore

Tearing down export walls

How would you feel if you labored for years to dismantle an immense, offensive wall, only to find another wall looming on the other side? You'd feel kind of defeated, wouldn't you?

Well, that's how a lot of Eastern European computer users are feeling. Their countries have succeeded in tearing down the walls of Communist restriction and repression, but now they face a red, white and blue barricade of stubborn export restrictions separating them from U.S. high technology.

According to analysts, the U.S. lags behind its allies in modernizing export policies.

The recent easing of restrictions on computer and telecommunications sales to the East by the Coordinating Committee on Multilateral Export Controls (Cocom) is a giant step in the right direction — a direction in which we should continue to advance.

Otherwise, Eastern Europe may look to other technology beacons — namely, Japan — and the U.S. will forfeit a valuable market opportunity.

In April, large numbers of Eastern Europeans were allowed to leave their countries for the first time to look at Western products displayed at Comdex/Europe in Paris. Their desires and needs came through clearly.

"They are hungry for hardware now, and in a few years they will be hungry for software," said computer center project manager Nada Kosir of her fellow Yugoslavians.

Though the Eastern Europeans spoke proudly of their countries' recent achievements, disappointment was evident when conversation turned to the U.S.

"Our import rules have been relaxed over the last several months; there are no restrictions anymore," said Damir Papandopulo, telecommunications manager at Elektra, Yugoslavia's largest electrical utility company.

The problem, he said, is that U.S. export regulations have not followed suit.

"We're more open, but we still have difficulty in legally importing U.S. equipment," said Prokop Toman, a Czechoslovakian economics professor.

"Legally" is the key word. It is possible to obtain U.S. big iron by snaking it through a tangle of Far East and Western European distributors, but this channel is discouragingly difficult and expensive. Cocom has vowed to make such "gray marketing" even more difficult.

The Romanians at the show talked of their hopes for U.S. trade with childlike eagerness. "Now we are open for business, for opportunities. This is a very unsaturated market," said Gheorghe Stefan Samoila, a senior engineer at the Institute for Computers (ITC), Romania's state-owned research center.

So far, however, their overtures have failed to breach the U.S. export barricade. "It is a problem to obtain imports from the U.S. We hope this will be relaxed in the future," said Calin Sandovici, a research and development engineer at ITC. Maybe this month's Cocom agreement is the answer to Sandovici's hopes.

Meanwhile, Romania is buying from U.S. competitors in Western Europe, Taiwan and Japan. It is also forming close alliances with France's Groupe Bull and Alcatel.

Some Eastern Europeans are even willing to leave their continent to plead their cases on our own shores. There will be interested parties from Yugoslavia, East Germany and the Soviet Union sizing up the vendor booths at the PC Expo show this week in New York City, hoping to establish contacts with U.S. firms eager to export hardware and software.

Encouragingly, the U.S. Department of Commerce helped make these visits possible by allowing PC Expo promoters to publicize the show at U.S. embassies and consulates abroad.

With its Foreign Buyer Program, the Commerce Department is attempting to encourage contact between small and medium-size U.S. manufacturers and potential overseas customers.

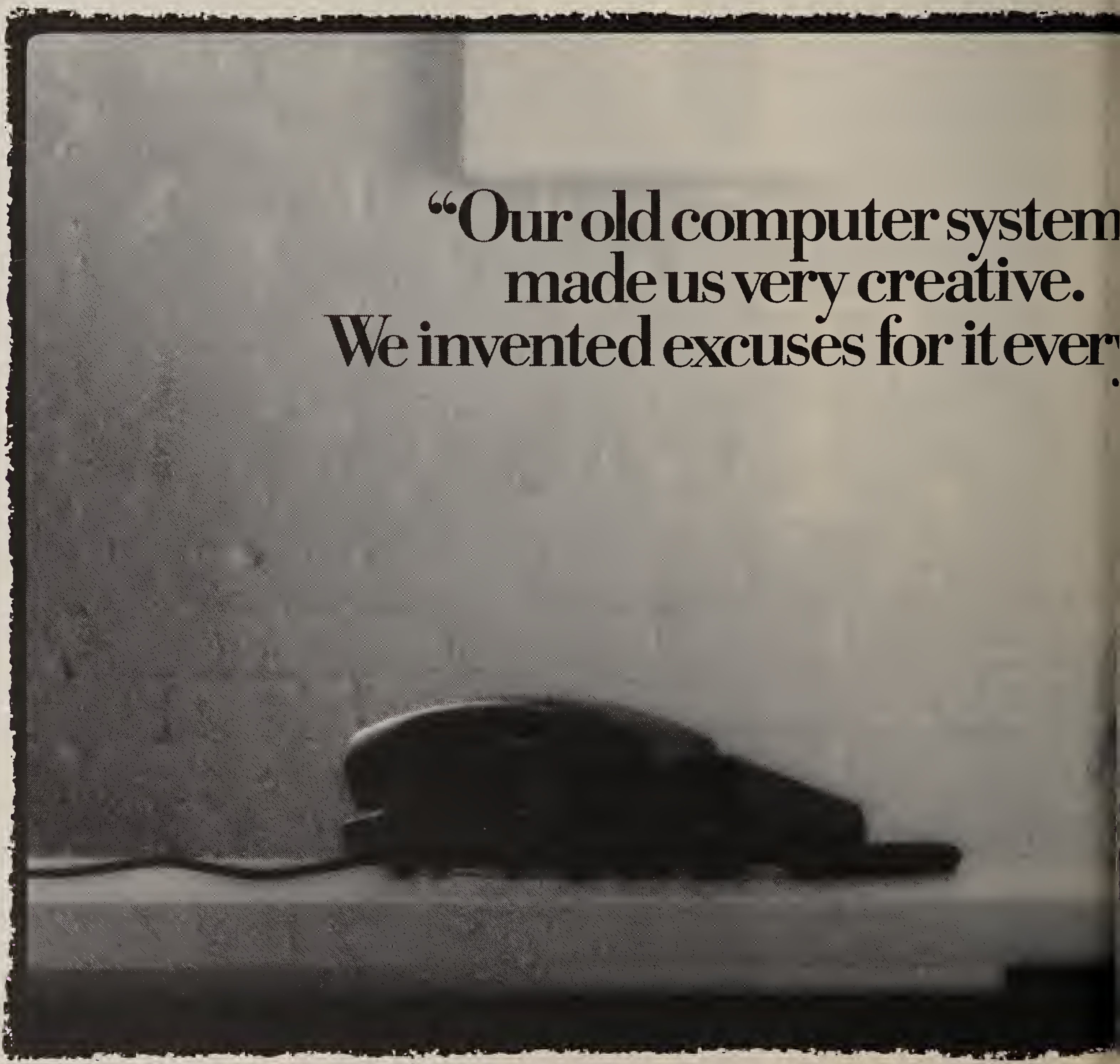
Though the program is four years old, this is the first time the department has granted PC Expo the right to participate. The move is overdue.

Granted, until very recently, most Eastern European currencies have not had the hard backing necessary to purchase U.S. products directly.

However, in both Czechoslovakia and Hungary, the situation has improved dramatically, according to Toman and Papandopulo. Changes are also expected shortly in East Germany and other Eastern Bloc countries.

Now is the time for the U.S. computer industry to push the feds to exploit these market opportunities and establish good relations with budding capitalist economies. It's high time to knock down our own outdated wall of restriction — and not just by removing one row of bricks.

Pastore is a *Computerworld* staff writer.



The IBM AS/400 Midrange Solution.

Maybe you need better applications, or more power, or improved service.

Or maybe the most reliable thing about your system is that you can't rely on it anymore.

When it's time to rethink, think about an IBM Application System/400.™

It runs over 5,000 applications, and finding the right one isn't like looking for a needle in a haystack. IBM's National Solution Center catalogues them all in a relational data base, so matchmaking is easier.

If growth has been a weakness, note that it's one of the AS/400's great strengths. You can grow an AS/400 from a few to hundreds of users, and the process is relatively painless.

What's more, your software will always work because, from smallest to largest, all models of the AS/400 share the same architecture and operating system.

And for service, how about a

*Source: Sierra5000 DataBase © 1990 IBM Corporation IBM and 400 are registered trademarks, and Application System/400 and AS/400 are trademarks of IBM Corp

D.C. area tops in system service

BY GARY H. ANTHES
CW STAFF

Propelled by a 61% increase in three years, the Washington, D.C./Baltimore area has moved to first place in the number of people employed by computer service firms, edging out such high-tech enclaves as Silicon Valley, Massachusetts' Rt. 128 and the New York City region.

A study by the Washington/Baltimore Regional Association (WBRA) of 10 multicity metropolitan areas said that the area employs 69,867 people in firms providing computer programming, analysis, operations, maintenance and related services.

The New York region employs 69,606, while Los Angeles/Anaheim/Riverside comes in third at 45,266 and San Francisco/Oakland/ San Jose places fourth at 43,636.

Nevertheless, Washington/Baltimore, with $5.7 billion in sales, takes second place to New York in receipts for computer services. New York posted receipts of $6.5 billion, while Silicon Valley grossed $4.4 billion and the Los Angeles region took in $3.7 billion.

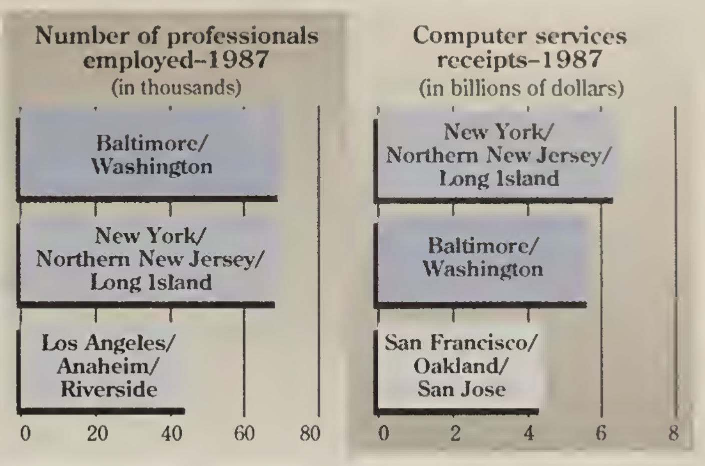
WBRA, using figures from the U.S. Census Bureau and the U.S. Department of Commerce, found mixed results when comparing salaries across the 10 metropolitan regions studied.

Systems analysts earned the most — $844.50 per week — in the Houston/Galveston/ Brazoria area and the least — $723.50 — in Dallas/Ft. Worth. Programmers earned a top wage of $708.50 in Silicon Valley and a low of $580.50 in both Dallas/Ft. Worth and the Chicago area.

Operators' wages ranged from $485.50 in Los Angeles/Anaheim/ Riverside to $392 in Philadelphia/Wilmington/Trenton.

Capital state

Baltimore/Washington may employ the most service professionals, but New York still rakes in the most cash



Sources: U.S. Department of Commerce, Washington/Baltimore Regional Association

day."

The AS/400 Model C10 is just over 2 feet tall.

system that performs its own checkups? With IBM Electronic Customer Support, an AS/400 can often diagnose its own problems and even tell your Customer Engineer what parts to bring.

In just one year, we've installed tens of thousands of AS/400s and the results have been spectacular. In a major survey of midrange system owners, the AS/400 users showed the highest level of satisfaction.*

Maybe you should join them.

To learn more about switching to an AS/400, call your IBM Marketing Representative or IBM Business Partner, or dial 1-800-365-4 IBM.

IBM

INTERNATIONAL
BRIEFS

Printer power

A decision late last month by West German technology companies **Siemens AG** and **Mannesmann AG** to combine their strengths in the worldwide printer market will mean a 50% expansion for Kent, Wash.-based printer manufacturer **Mannesmann Tally Corp.** The Mannesmann subsidiary — which is soon to be 49% owned by Siemens — will be starting its newly combined and broadened life with approximately $450 million in worldwide revenue, as well as 2,400 employees and five major printer technologies.

……

Hitting a slump

Meanwhile, Paderborn, West Germany-based **Nixdorf Computer AG,** which is scheduled to merge with Siemens in early October to form what will reportedly be the largest computer company in Europe, reported 1989 annual revenue down 7% in the domestic market and up 4% worldwide compared with last year's figure. The year-to-year decline in revenue was a first for the entrepreneurial company — occasioned, a spokesman stated, by factors including a price slump in traditional Nixdorf markets and customer uncertainty in the face of the coming Siemens acquisition.

……

Most wanted

The **New Zealand Department of Justice** has a desire to to be more vigilant when it comes to software copyright protection. First, however, the lawmakers would like to collar something that has proven to be elusive the world over: a definition of just what it is that is being protected. The hardest aspect of protecting software from copyright infringement, a department representative recently told the New Zealand Society for Computers and the Law, is developing an "inclusive and technically adequate" definition of a computer program.

REPORTER'S NOTEBOOK

Adapso buttons down, tones up

BY NELL MARGOLIS
CW STAFF

WASHINGTON, D.C. — Adapso's recent semiannual management conference and computing services industry international congress found the software industry association recovered from the identity crisis that seemed to grip it a year or so ago — or at least better able to put on a calm front.

"This is the most businesslike Adapso I've ever seen," one longtime attendee said.

In the halls of the hotel, some 1,200 software mavens — approximately 33% from beyond U.S. borders, with the lion's share from Japan — gathered to hatch deals and negotiate alliances.

Missing was what one seasoned industry observer unfondly recalled as "the ego-driven self-aggrandizement and endless clubbiness" of conferences past.

Absent as well was the strain that marked more recent Adapso meetings: a concern with the wholesale defection of some of the industry's personal computer software firms from the decades-old association to the aggressively proactive and relatively young Software Publisher's Association (SPA).

"Frankly, if the issues that SPA is concentrating on — piracy, for instance — are a company's preoccupying issues, then SPA is probably where they should be," former IBMer and current Adapso spokesman William Warner said. "Adapso is trying to represent the software industry as a whole and on a whole-world basis."

It would be naive to believe that Adapso's recent turmoil could be so neatly dispatched. One longtime member, for example, dropped out this year when faced with the prospect of a dues raise — itself an indirect result of the SPA challenge. Another member, a high-profile young software company, is hanging in with Adapso for the moment, but one of its cofounders acknowledged that it was casting sidelong glances at SPA. The industry, he observed, changes quickly, and Adapso always seems a day late and a dollar short.

Nevertheless, according to Warner, the six months since the last Adapso confab have seen positive gains, even in the association's touchy area: Such notable firms as U.S. Sprint Communications Co., The Gartner Group and long-sought-after but elusive Computer Associates International, Inc. joined; McDonnell Douglas Computer Systems Co., a former Adapso member, rejoined.

The newly buttoned-down and toned-up Adapso meeting featured the following:

- A deal-making session in which each participant took the podium, introduced his company and described what kind of strategic partners it was in the market for. The "slave-market" forum, an experiment only three meetings ago, is now a staple of Adapso conferences.
- A keynote speech by Japan Economic Foundation President Shoichi Akazawa. This was a homecoming of sorts, because Akazawa, who is also the former chairman of the Japan External Trade Organization, was the keynote speaker at Adapso's premier world congress held in San Francisco 10 years ago. Akazawa urged his audience to shun protectionism and to continue to embrace trade negotiation. He also mentioned in passing that "80% of the parts in American computers are made in Japan."
- A workshop in which systems integrators sought to discover what users really want from them — fewer buzzwords, clear agendas and a quick trip from promise to performance.
- An address by Merrill Lynch & Co. Executive Vice-President DuWayne Peterson Jr. on what large customers expect from the software industry: standards and easy-to-use products — and also fewer buzzwords, clear agendas and a quick trip from promise to performance.

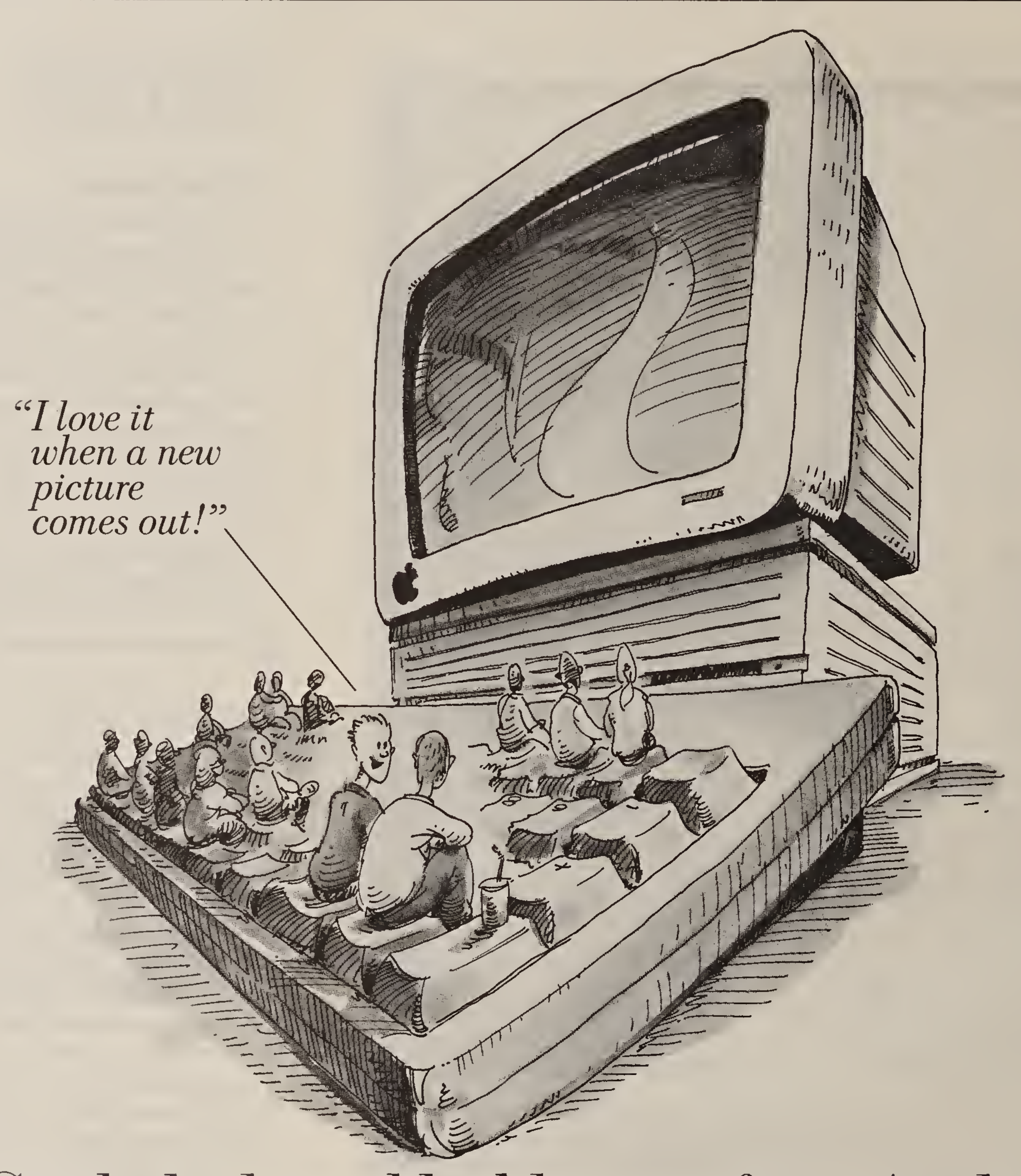
Bell Atlantic consolidates

FRAZER, Pa. — Bell Atlantic Customer Services, Inc. recently merged the muscle of its three computer hardware maintenance arms into a single service. The new entity, dubbed Bell Atlantic Computer Technology Services, Inc., moves into place as the largest U.S. fourth-party support services company, Bell Atlantic claimed.

Bell Atlantic said it consolidated the three units to eliminate redundancies and provide customers with a single point of contact. The units supply parts and repairs for large businesses that handle their own maintenance, OEMs and third-party maintainers such as the former Sorbus, Inc., now a separate Bell Atlantic subsidiary.

The three merged divisions are former Camex-CPX, which specializes in Control Data Corp. parts and repairs; Dynservice Network, which repairs IBM and Digital Equipment Corp. head disk assemblies and peripherals; and Electronic Service Specialists Ltd., a DEC repair specialist.

John Welsh, executive director of sales and marketing, said the group will add new platforms to its service roster later this year.


"I love it when a new picture comes out!"

Catch the latest blockbusters from Apple®
at Data Preference.

Now you can catch all of Apple Computer's latest hits at Data Preference. Our selection of premiere products include the new performance powerhouse, the Macintosh® IIfx. The compact, but versatile Macintosh IIci. The desktop workhorse Macintosh SE/30. Plus the fast and expandable LaserWriter® II family of products. And much, much more.

Data Preference's supporting cast also brings you great performances with service that includes a toll-free phone number for on-line diagnostics. Plus, our short- and longterm rentals, along with operating and finance leases are just the ticket to make it all available.

You can give Apple Computer a starring role in your company by calling Data Preference, toll-free, for the on-going service and support you need.

Authorized Dealer

DATAPreference
Incorporated
Formerly Leasametric Data Communications, Inc.

Northwest 800.343.7368, 415.574.5797 • Southwest 800.638.7854, 818.708.2669 • Central 800.323.4823, 708.595.2700
Northeast 800.241.5841 • Southeast 800.241.5841, 404.925.7980 • London 011.44.923.897000
© Copyright 1990, Data Preference Incorporated. Apple, the Apple logo, Macintosh and LaserWriter are registered trademarks of Apple Computer, Inc.

EXTRA! Terminal: PROFS
File Edit Preferences Session Macro Windows Help
ATTACHMATE PROFS MAIN MENU
Clock
Settings
EXTRA! Terminal: Accounts
File Edit Preferences Session Macro
Windows Help
File Options Wind
Write
Paintbrush
SmartPad
Reset
SysRq
Clear
PA1
PA2
LOGON
PROFS
Enter

Look at 3270 connectivity through our Windows.

If you need to connect PCs to an IBM® mainframe, there are some clear advantages to doing it with Attachmate's new EXTRA!™ for Windows.

It's built from the ground up as a Microsoft® Windows application, combining EXTRA!'s famous power and versatility with Windows' legendary ease of use.

Connecting to the mainframe is as simple as pointing to a dialog box and clicking the mouse. File transfers? A quick pull-down menu selection. Multiple sessions? Up to 26 of them, each in its own window.

But EXTRA! for Windows doesn't stop with the friendly features of Windows. It adds a few of its own.

For example, SmartPad™ lets you define buttons for various actions on an on-screen keypad. Define buttons for logging on, invoking macros, entering PF keys, and launching special functions.

And we've put all of our connectivity experience into EXTRA! for Windows. So it's much more than a pretty interface — it's fast and reliable.

EXTRA! for Windows supports coax (CUT and DFT) and LANs — including IBM's Token Ring Interface Coupler (TIC). And it's smart enough to maintain your connection, even when you run non-Windows applications.

Call 1-800-426-6283 now for your free demo disk. And open the window to better PC-mainframe connections.

EXTRA!™ FOR WINDOWS

Attachmate®

Quality micro-mainframe solutions.
Attachmate Corporation
13231 SE 36th Street • Bellevue, WA 98006 • (206) 644-4010

© 1990 Attachmate Corporation. All rights reserved. Printed in USA.
EXTRA! and SmartPad are trademarks of Attachmate Corporation. IBM is a registered trademark of International Business Machines Corporation. Microsoft is a registered trademark of Microsoft Corporation.

My network in marketing won't share

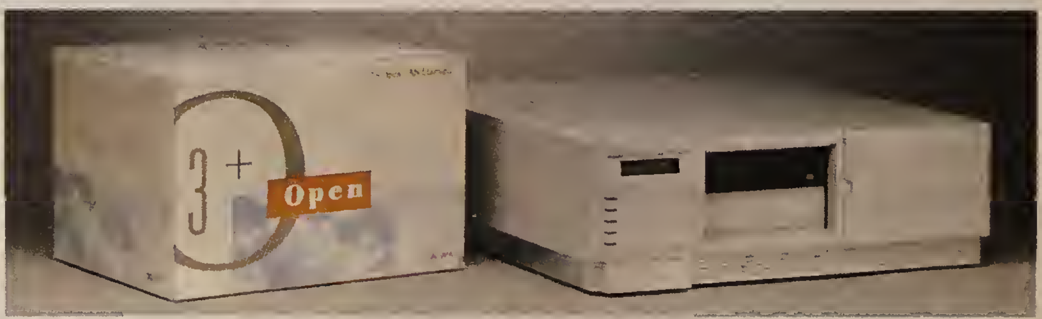
Now what?

The latest directive from senior management is a doozy. Marketing and manufacturing must now share applications. As for all those different PCs and systems in place, management is "confident you can meet that challenge without incurring significant additional capital expense."

Now what?

For many corporate managers, the answer to that question is 3Com® 3+Open™ systems. 3+Open systems start with LAN Manager, co-developed by 3Com and Microsoft, and include the most extensive range of connectivity and electronic mail products. It's a powerful computing platform with the flexibility to support both current business applications and emerging client-server applications.

3+Open systems let your people share information whether they use a PC, Macintosh, IBM, DEC,



with the network in manufacturing.

HP or Bull host. What's more, 3+Open systems are compatible with DOS, OS/2, UNIX and Macintosh applications.

To enhance your network performance and security you can run 3+Open systems on 3Com 3Servers,® network servers designed exclusively for networks.

The result: a system that can actually leverage the value of the information anywhere in your company.

To find out how 3Com 3+Open systems are working in major corporations around the world, just call **1-800-NET-3Com**, Dept. D5014. You'll also receive a brochure on 3+Open client-server systems.

At 3Com we make internetworking products and wide area networking products, as well as adapters, operating systems and servers. Because what good is sharing along one part of the network if you can't rely on the rest of it as well?

3Com®

We network more types of systems
to more types of systems.™

©1990 3Com Corporation, 3165 Kifer Road, Santa Clara, CA 95052. Telephone (408) 562-6400. 3Com, 3+Open, 3Server and the 3Com tagline are trademarks of 3Com Corporation. Macintosh is a registered trademark of Apple Computer, Inc. IBM and OS/2 are registered trademarks of International Business Machines Corporation. DEC is a registered trademark of Digital Equipment Corporation. HP is a registered trademark of Hewlett-Packard Company. UNIX is a registered trademark of AT&T. Bull is a registered trademark of Bull HN.

Federal IS vendors: There's good and bad news

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — If you are selling products or services that support electronic data interchange, electronic imaging, computer operations and maintenance or anything to support a high-tech war on drugs, now may be the time to open that office in Washington. But if you are into leased telecommunications services or mainframes, you can expect slim pickings from the federal government during the next five years.

Those are among the conclusions to be drawn from an extensive analysis and forecast of the federal information systems market recently released by the Electronic Industries Association (EIA).

The EIA said that Uncle Sam's spending on IS will show declining real growth during the next five years, moving slowly from $19.4 billion in 1991 to a nearly flat $20.3 billion in 1995. IS outlays by the U.S. Department of Defense (DOD) will actually decline, but spending will be strong at the National Aeronautics and Space Administration, the Environmental Protection Agency (EPA) and the Departments of Agriculture, Transportation and the Treasury, according to the EIA.

For defense, which will show an average 1.2% annual fall in IS expenditures, spending will be aimed at those systems promising to reduce manpower costs. A new DOD program, called Corporate Information Management, will drive much of what the Pentagon spends for its non-embedded and non-mission-critical systems, the EIA said.

Low funding

Real growth of government information systems spending will continue to fall over the next five years, according to projections

Fiscal year	1991	1992	1993	1994	1995
Real growth	3.8%	2.2%	1.3%	0.9%	0.5%
Expenditure (in billions)	$19.4	$19.8	$20.0	$20.2	$20.3

Source: Electronic Industries Association

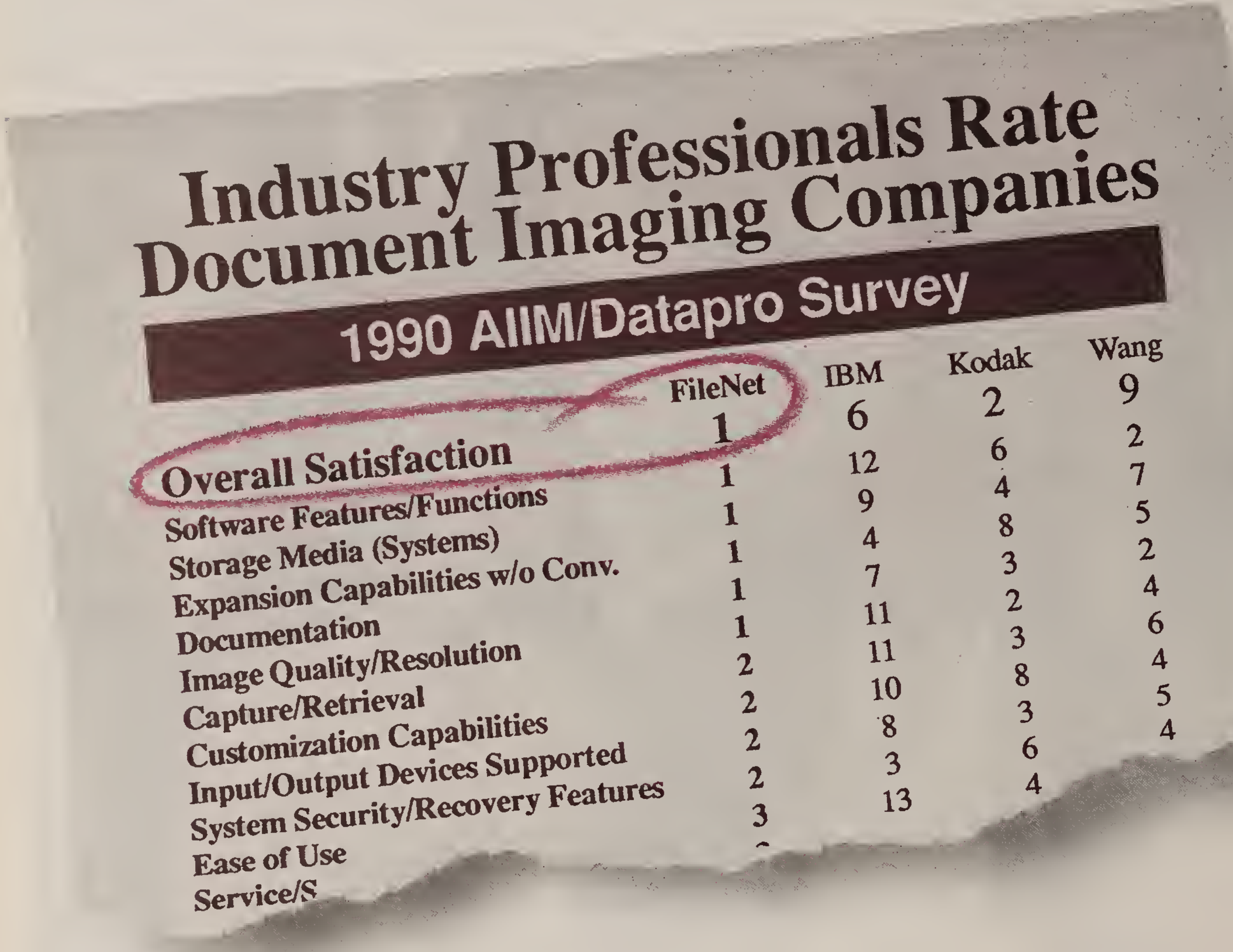
CW Chart: Doreen Dahle

In civilian agencies, IS spending increases will be driven by a growing trend to contract out to save on personnel costs, and agencies that traditionally do a lot of outsourcing — such as NASA and the EPA — will lead the way, the EIA said. Agencies that traditionally do a lot of outsourcing will post 5.6% annual increases in IS spending, while civilian agencies will show only 3.1% gains.

Aggregate software purchases will be flat — no growth over the period — but sales of commercial off-the-shelf software and software tools will do better than average, the EIA said.

In commercial services, operations and maintenance will post a strong 3.7% annual gain, driven by budget squeezes that require retention and support of existing systems, and computer time-sharing outlays will rise 2.4% per year. Leased telecommunications services are expected to fall 1.3% annually.

Corporate Information Management is an attempt to reduce the number of redundant systems in the DOD and to define common data requirements and formats for applications such as payroll, distribution and contract payments. The EIA estimated Corporate Information Management will save the government $2.2 billion over the next five years. There will be fewer small systems but more opportunities for systems integrators to build large ones, the association said.



Industry Professionals Rate Document Imaging Companies

1990 AIIM/Datapro Survey

	FileNet	IBM	Kodak	Wang
Overall Satisfaction	1	6	2	9
Software Features/Functions	1	12	6	2
Storage Media (Systems)	1	9	4	7
Expansion Capabilities w/o Conv.	1	4	8	5
Documentation	1	7	3	2
Image Quality/Resolution	1	11	2	4
Capture/Retrieval	2	11	3	6
Customization Capabilities	2	10	8	4
Input/Output Devices Supported	2	8	3	5
System Security/Recovery Features	2	3	6	4
Ease of Use	3	13	4	
Service/S				

IN AN INDUSTRY WHERE IMAGE IS EVERYTHING, FILENET® RANKS #1

Recently, the Association of Information and Image Management (AIIM), together with Datapro Research, conducted a survey of over 1,700 information industry professionals. They rated FileNet Number One over some very impressive companies. Companies like IBM, Wang and Kodak.

FileNet makes imaging work

Maybe they were impressed that FileNet systems are built on an open architecture, allowing a variety of computers to access and store images, data and text of any type on a FileNet system.

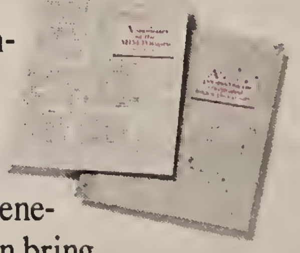
Or perhaps it was FileNet's WorkFlo® family of application software, the key to automating business applications that manage and process large volumes of incoming documents and files.

Most likely, it was because FileNet has the best track record of successful production installations of any image processing company in the world. In fact, FileNet customers recently received four out of eight BIS/CAP awards for imaging excellence... including first place for American Airlines.

If you're interested in image processing, shouldn't you talk to the imaging company with the most satisfied customers?

Free report

Conduct some research of your own. For the story behind the AIIM/Datapro survey, call or write FileNet Corporation, 3565 Harbor Blvd., Costa Mesa, CA 92626, 714-966-3900. In today's competitive environment, you can't afford to overlook the benefits imaging can bring to your business.



FileNet®
First in image processing.

FileNet and WorkFlo are registered trademarks of FileNet Corporation.

NATIONAL

BRIEFS

Slimming with Shark

Wang Laboratories, Inc. earlier this month closed the sale of its Wang Financial Information Services Corp. to a newly formed **Infotechnology, Inc.** subsidiary called **Shark Information Services Corp.** The approximately $16 million purchase price will go toward debt reduction and working capital, said a Wang spokesman, who also noted that the company will continue to supply financial market data to its customers.

....

Finally CFO

Control Data Corp. now boasts a new executive vice-president and chief financial officer, filling a slot that has been vacant for nearly a year. **William J. Miller,** 44, recently acting president of Micrognosis, CDC's trading room systems unit, assumed the title on June 11, reporting to CDC President and Chief Executive Officer Lawrence Perlman. Perlman has been acting CFO since the departure of John K. Buckner last August.

IS execs: In search of survival

Fertile organizations offer support, involvement and bench strength

BY JAY GAINES
SPECIAL TO CW

In recent months, there has been a tremendous amount of movement within the ranks of top information systems executives, particularly in financial services, in which technology plays an integral role.

In a few isolated cases, IS executives have been elevated to general management posts. Most of the time, however, executives appear to be playing a game of musical chairs in which an individual who has met expectations marginally or not at all in one job is tapped to solve a whole new set of problems.

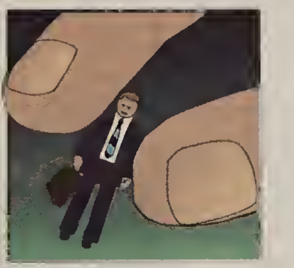
Unfortunately, the track record of top systems executives entering an organization from the outside is poor. The odds are that such an individual will not be on hand three to four years down the road.

Breaking in

Among senior management positions, the job of top IS executive may be the most difficult to enter from outside a company. The difficulty arises from barriers of psychology, culture and language, as well as the expectations surrounding the role.

Invariably, the new IS executive suffers from culture shock as he learns how to operate as part of the management team while taking charge of the initiatives that he was hired to pursue.

The IS executive's isolation can be compounded by a personal style and manner of speaking that are overly technical in orientation, a lack of comfort with technology on the part of management, the typically large level of investment in technology and the long time frame for completion of many projects.



The isolation also increases dramatically if the executive's agenda is viewed as one of technology initiatives rather than the needs and wants of the business unit or enterprise.

Blending in becomes even more difficult, and the chance of success lower, based on the extent to which the IS executive has a large and fragile ego, a big-bucks compensation package, a high profile and a high level of expectations.

In examining the factors that can hobble a new top IS executive, it is helpful to look at the handful of corporate cultures where technology has thrived and contributed meaningfully to the operations it supports.

The top IS executives in these environments have been well-integrated into the management culture, and some of them have gone on to win significant general management responsibilities.

At numerous other organizations, there are pockets of successful IS activity. Here again, the role of organizational integration is key.

The following are true in both these groups of successful entities:

- The organizations tend to be flat, rather than hierarchical. There is strength throughout the ranks of information technology professionals. The role of the top IS executive is coordinating and supporting.
- Management encourages experimentation, innovation and managed risk-taking.
- The mind-set of the information technology professional is in sync with the business. It is focused on making technology work and generally on keeping it simple.
- Successes tend to result from successive hits more than delivery of a megaproject intended to fix everything.

The critical factor for a corporate environment where the information technology discipline thrives is attracting the most promising individuals into the IS organization, helping them develop and ensuring their integration with the business.

The job of building this environment is an undertaking to be shared by top management, the IS organization and the business units.

However, many of these business roles quickly become dead-end jobs; they don't compare to the opportunities in the IS arena available to a strong performer.

It is important to note, however, that IS professionals should demand that their organization provide the opportunity to be successful in IS.

> SUCCESSES TEND to result from successive hits more than delivery of a megaproject intended to fix everything.

The key professionals in the IS organization must grasp the needs and dynamics of the business. At the same time, they must educate business professionals about the role and benefits of technology.

This type of behavior must be ingrained in the culture and apparent to professionals early in their careers if the organization is to forge a competitive edge through technology — and if IS executives are to make major career advancements.

Hidden treasures

It is also important for these organizations to keep managers in the IS organization. Individuals rising within the ranks of IS management often do not recognize what a valuable commodity they are or might become. They sometimes get distracted along the way, viewing jobs in business units as better opportunities than the ones in front of them.

They should take the initiative to identify the skills and experiences they need to reach their professional goals: exposure to competitive and strategic issues, for example, or the proper mix of applications development and technical operations. They should then demand that their organization provide opportunities for them to develop these skills and gain the experience.

Given an IS organization with this kind of depth, the successful IS leader still must ensure that he is integrated into the day-to-day thinking and operations of the company and has support from and access to top management. Top management can facilitate the integration of IS activity by perceiving the IS executive as an integral part of the team.

Gaines is president of Jay Gaines & Co., a New York-based executive search firm.

WANTED:
WARRIORS

If you consider a business suit your battle dress and technology as heavy artillery, you may be perfect for Broadway & Seymour Consulting.

We're a small but very aggressive systems consulting and software development firm. In fact, we're so aggressive *Business Week* rated us as one of the fastest growing high-tech companies in America.

So, if you'd like to join an elite team engaged in the art of technological warfare, call Camille Hankins at 1-800-274-9287 or send your resume to: 302 S. Tryon St., Charlotte, North Carolina 28202.

BROADWAY & SEYMOUR CONSULTING

We're looking for warriors.

Positions:
- Managing Consultants
- Software Engineers
- Consultants
- Technical Instructors
- Technical Writers

Expertise:
- Relational Technology & 4GL
- Midrange Systems
- SW Engineering & Case Tools
- Telecommunications & Distributed Environments

Network Technical Engineer

Planning design and implementation of Intelligent Networks. Design distributed real-time multi-tasking computing and switching environments. Define and deploy service creation environments utilizing object-oriented software. Develop network models utilizing queuing theory and traffic analysis. Perform economic analysis for network planning. Design operation and support systems conforming to OSI model.

Requirements:
- BS Computer Engineering with major field of study in operating systems or equivalent.
- Graduate level coursework or the equivalent in the following subjects: data communications, telecommunication networks, optical fiber communications, network analysis, object-oriented software engineering, integrated digital networks, and ISDN.
- Demonstrated ability in use of C language, UNIX operating system and SS7.
- Demonstrated knowledge of advanced software engineering tools and techniques, including structured analysis design.
- Demonstrated knowledge of fiber optic transmission systems and design, including SONET.

Salary
$38,500 per year

Hours
40 per week

The job order number for this job opportunity is 736309. Please apply at Overland Park Employment & Training Office, 8417 Santa Fe Drive, Overland Park, Kansas, 67212-2749, phone (913) 642-8484, or refer to job order number when submitting a resume to that office.

We are proud to be an EEO/AA employer M/F/H/V. Also, we maintain a drug free workplace and perform pre-employment substance abuse testing.

Data Processing

As a leader in sophisticated HVAC systems, Landis & Gyr Powers has worked on landmark projects worldwide. Today, as information technology continues to revolutionize the way we do business, we seek a dynamic individual to work independently at the highest technical level of application systems analysis and programming.

Sr. Programmer/Analyst

Responsible for supporting our rapidly growing service business segment, you'll maintain and enhance existing service systems and work with users to evaluate business needs and determine appropriate technology to meet new opportunities. You'll also participate in the development of distributed processing strategies, as well as project planning and scheduling.

Selected candidate will have a college degree and 5+ years of programming and analysis background. Experience in data base technology, online development and COBOL is required; knowledge of IDMS, ADS/O, LRF and DOS/VSE is preferred. PC background is also expected, and VAX and INGRESS experience would be a plus. Strong written and verbal communication skills, and team leadership ability essential.

In return for your expertise, we can offer you a challenging, high-energy environment, outstanding growth potential, and an attractive compensation package. For confidential consideration, please forward your resume to:
Kevin Mahoney,
Landis & Gyr Powers, Inc.,
1000 Deerfield Parkway,
Buffalo Grove, IL 60089.
Equal opportunity employer m/f.

Join the name behind the landmarks.

Landis & Gyr Powers, Inc.

LANDIS & GYR

One Company/One Team
Dedicated to Customer Satisfaction

SAUDI ARABIA

Senior Systems Analyst
Process Control Computer Technicians

Resource Sciences Arabia Ltd. has an immediate need to add the following individuals to its team to operate and maintain a 1000 MW power plant in Yanbu, Saudi Arabia.

SENIOR SYSTEMS ANALYST: Identify situations in which the application of computers would be beneficial to the department, and analyze and design possible automated systems for these situations. Plan, organize, train, and direct the activities of the computer support personnel staff.

A BS in computer science, engineering, mathematics, or comparable discipline required, along with six years experience in commercial engineering or scientific programming including three years in systems analysis and three years in a supervisory capacity. Experience designing and implementing interactive commercial and engineering applications on a mini-computer (preferably Prime), and experience on PCs is also highly desirable.

PCC PROGRAMMER: Provide technical analysis, minor engineering under design and resolution of engineering problems. Design and coordinate loop control and display diagrams or process control and monitoring computers.

A bachelor degree in computer science, engineering, or mathematics required. Six years experience with programming process computers (IBM), and two years programming on-line real time computers required.

PCC TECHNICIAN-DEC: Troubleshoot, test, repair, and maintain process computer hardware and related equipment.

An accredited technical institute certificate with specialty in process computer hardware required. Five years experience of which two have been in a power plant, desalinization plant or chemical plant.

Technical training on (DEC) PDP-11/44, PDP-11/23, PDP-11/03 computer systems and associated peripherals. Training must have included vendor diagnostics and RSx11 operating system programs.

PCC TECHNICIAN-INDACTIC: Duties, education, and experience same as above. Technical training of Brown Boveri & Cie INDACTIC 33/41, a telecommunications station hardware maintenance course required. Experience on design, implementation, and maintenance of VF communications networks to include RS 232 protocols and 4 ma to 20 ma control and data acquisition loops is highly desirable. Two years experience in maintenance of associated plant instrumentation loops and equipment required.

PCC TECHNICIAN-NETWORK 90: Duties, education, and experience same as PCC Tech-DEC.

Technical training of Baily Controls Network-90 multiplex and/or controls system hardware maintenance required. Experience on design, implementation, and maintenance of VF communications networks to include RS 232 protocols and 4 ma to 20 ma control and data acquisition loops is highly desirable. Two years experience in maintenance of associated plant instrumentation loops and equipment required.

PCC HARDWARE ENGINEER: Responsible for technical and design support for all activities requiring use and maintenance of on-line process computer systems.

Bachelors degree in computer science or engineering required. Ten years experience on process control computers and associated instrumentation for power plants, desalinization plants, or chemical plants required.

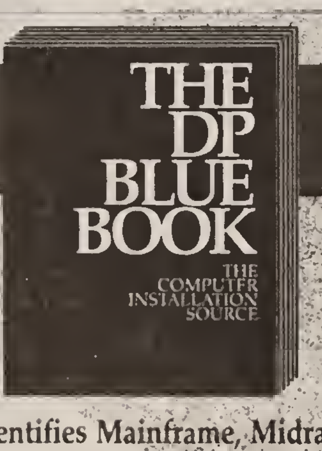
Training required in the following: (DEC) PDP-11/44, PDP-11/23, PDP-11/03 computer systems; MODCOMP "Classic" hardware systems; Brown Boveri & Cie INDACTIC BECOS 30 operating system, and/or Baily Control Network 90 multiplexor units; Babcock and Wilcox FLIC operating system; and associated peripherals.

We offer an attractive, highly competitive compensation package including free housing, transportation, and insurance, annual vacation and R&R leave plus completion bonuses. Current U.S. tax laws exempt foreign earned income from tax for qualifying individuals.

If interested, please fax a complete resume with certificates to 714-543-0955 or mail it to our affiliate company, Attn: P.A. Cooper, Dept. 90-58 at:

HOLMES & NARVER SERVICES, INC.
999 Town & Country Road
Orange, CA 92668

Equal Opportunity Employer



COMPUTER DIRECTORIES

THE DP BLUE BOOK
THE COMPUTER INSTALLATION SOURCE

ORDER YOURS TODAY!

- Identifies Mainframe, Midrange and Mini-Computer Installations
- Hardware/Software Configurations
- M.I.S. Management Contacts
- Cross-Referencing Indexes
- Industry Type

Call For
The D.P. Blue Book
In Your State(s).
CALL 1-800-827-8338

IRG™

THE UNIVERSITY OF OKLAHOMA
OUHSC
HEALTH SCIENCES CENTER

The University of Oklahoma Health Sciences Center is seeking applications for Assistant Director of Research & Education Computing Services.

This is a 12 month full time position reporting to the Director of Computing Services, responsible for managing the Academic Computer Center - A centralized function supporting the Academic Requirements of the campus. The successful candidate will be highly motivated and creative with strong organizational and supervisory skills.

The Assistant Director providing technical, programmatic, and consulting support to the Academic departments; conducting training in computer use and applications; coordinates hardware/software purchases and works with students in computer laboratory.

Qualifications: Master's degree in Biostatistics, Computer Science, Mathematics, or a related field, or equivalent experience. Five (5) years experience in the direction, control, and/or supervision of a university or university affiliated computing facility.

Submit a resume, name and contact information for three (3) professional references, and a letter of interest stating specific qualifications which would merit your consideration for this position to: Personnel Services, University of Oklahoma HSC, P.O. Box 26901, OKC, OK 73190.

Deadline for Application: Position will remain open until filled. Evaluation of applications will begin: June 2.

Northern California

Near mountains, ocean, Tahoe, Yosemite.

Contractors & Full Time

DB2, CICS, VSAM, IDMS IMS, CSP, ESA

- Data Base Managers
- Director Data Center
- Data Security Analysts (RACF)
- Project Managers
- Programmer Analysts
- Systems Programmers
- Systems Analysts
- Data Base Analysts

Free 1990 salary survey available. Send resume

Chuck Klein & Assoc.
3840 Thorson Dr.
Placerville, CA 95667
(916) 644-6396

Systems Analyst

M.S. in Computer Science. Will be involved with analyzing business procedures to convert data to programmable form using BISYNC, ASYNC and COPS Protocols to set up communication links between POS terminals and host processors. Will develop tools for scrip terminals for retail application. Will use concepts and theories of computer architecture and microprocessing, PMS hardware and C Tree software. Must have one year experience as a Systems Analyst. 5 day 37.5 hr/wk $35,000/yr. Apply with resume and references to: **BMT, 339 East Ave., Suite 315, Rochester, NY 14604.**

SYSTEMS OPPORTUNITY
ORACLE DBA

Westinghouse Corporate Information Services is the major center for processing of data and financial information utilized by the progressive Fortune 500 Westinghouse organization. We now seek a resourceful systems professional capable of handling corporate database and technical support activities for Oracle software applications. Our systems development setting focuses on development of large distributed mainframe applications in an IBM/DEC environment. Your responsibilities will encompass database administration, including database definition, tuning, start-up/shutdown and recovery. We will also rely on you to complete Oracle technical consulting and problem-solving projects.

Qualifications include a Bachelor's degree in Information Systems, Computer Science or an equivalent area complemented by a minimum of 3-5 years experience in information systems. At least 1 year of experience in Oracle database administration (preferably Version 6) is required. Preferred candidates will possess experience with mainframe DEC/VAX VMS or other Oracle products such as SQL*FORMS, Application Foundation and SQL*NET.

Located in a beautiful residential suburb just 10 miles east of downtown Pittsburgh, our premier organization is prepared to reward your talents with an attractive salary and superb benefits. Build your future with an exciting industry leader by directing your resume in confidence to: Human Resources Department

WESTINGHOUSE CORPORATE INFORMATION SERVICES
1001 Brinton Road
Pittsburgh, PA 15221

An Equal Opportunity Employer M/F/H/V

Westinghouse

DP Professionals

WORK FOR A COMPANY THAT'S ON THE BALL WHILE YOU'RE HAVING ONE.

Arms, Inc. specializes in providing high-caliber, solution-oriented software services to multiple industries. Our extensive experience in the installation and support of all IBM systems platforms and software engineering includes analysis, custom design, programming, consultation, DP specialization, documentation, conversions and project management. We've earned a solid reputation for accomplishment, reliability, and professionalism among the small companies and Fortune 500 organizations we serve.

Arms, Inc.'s Virginia Beach branch currently has a number of openings for experienced Programmers and Programmer Analysts with experience in:

- IDMS/ADSO
- AS400
- CICS
- COBOL
- SYSTEM 38
- DB2/CSP
- DB2/TELON
- DMAS
- CMAS
- MAPICS
- ADABASE/NATURAL
- PATIENT CARE SYSTEMS
- DECVAX/VMS with GRAPHICS

Turn the tide on your career with a move to Arms, where you'll enjoy opportunities for advancement, competitive salaries and an outstanding benefit package that includes a company car or car allowance as well as relocation assistance.

You're going to love the lifestyle, too. With a temperate climate and moderate cost of living, Virginia Beach offers all the excitement of a resort with the culture and sophistication of a metropolitan area. Miles of sparkling, Atlantic beaches will fill your weekends with swimming, sailing and fun in the sun.

So get on the ball! For a challenging career and a vacation lifestyle, contact Sandy James at (804) 490-1800, FAX (804) 490-7355. Positions also available in our Richmond and North Carolina branches.

ARMS INC.

ARMS, Inc. • Attn: Sandy James • 5501 Greenwich Road, Suite 200 • Virginia Beach, VA 23462

FLORIDA

We are Romac & Associates, specialists in the data processing Industry. Currently our technically sophisticated clients have requirements for:

- PROGRAMMER ANALYSTS
- SYSTEMS PROGRAMMERS AND OTHER
- MIS PROFESSIONALS

WHO HAVE EXPERIENCE IN ANY OF THE FOLLOWING AREAS:

- IBM-MVS
- CICS
- COBOL
- ASSEMBLER
- TANDEM/TAL
- IMS
- IDMS
- DB2
- CASE TOOLS
- M&D/MSA
- SYSTEM 38
- AS-400
- RPG III
- FOCUS
- INGRIS
- HP/VAX
- C

Our clients offer top salaries and a perfect climate. Please send your resume or call any of our consultants.

1 Harbour Place #880C
Tampa, FL 33602
(813) 229-5575

ROMAC
Professional Recruiters
All fees are assumed by our client companies.

CAREER MOVE OVERDUE?

Get back on track with a challenging learning experience that offers career growth in a high tech work environment. If you consider yourself a "top gun" who wants to get in front of the decision maker, work with the most prestigious companies in **Florida** and have 3+ years of experience with one of the following skills:

AA/OCS
DB2/SQL
AS400/RPG III
MVS/M&D
TANDEM/PATH
CICS/COB
INFORMIX
FOCUS
ORACLE
UNIX/C
IMS/DB/DC
S/P MVS
CASE TOOLS
MVS/ALC

Then call or send resume to
COMPUTERPEOPLE, Dept. C1

12225 28th Street N
St. Petersburg, FL 33716
813-573-2626

20 N. Orange Avenue, Ste. 1400
Orlando, FL 32801
800-888-1064

2005 W. Cypress Creek Rd., Ste. 3
Ft. Lauderdale, FL 33309
800-777-8603
305-771-8603

COMPUTERPEOPLE

•CICS/DB2•
•CSP•

CICS SYSTEMS+APPS EXPERTS LEARN DB2, IMS, VTAM, VSAM APPS, DBA, INTERNALS, DEV.

DATABASE DESIGN
PERFORMANCE & TUNING
APPLICATIONS DEVELOPMENT
EXPERTS
WORLDWIDE TRAVEL or SO. CALIFORNIA
NEW PRODUCT DEV.
$35K - $80K

LIVE ANYWHERE IN THE USA
2 1/2-5 DAY WORK WEEK!
4 WEEKS ON 1 WEEK OFF!

If you prefer a career in the "fast lane" we offer the best work schedule and benefits! Call Rick Deans Now!
213-276-6339 800-323-1080
FAX: 213-658-1599
9100 WILSHIRE BLVD #442
BEVERLY HILLS,CA 90212

COMPUTER PROFESSIONALS

OUR EXCELLENT REPUTATION IN THE DATA PROCESSING INDUSTRY AND SOLID CLIENT BASE WILL OFFER YOU THE OPPORTUNITY FOR PROFESSIONAL GROWTH. WE HAVE SPECIFIC NEEDS FOR CONTRACTORS AS WELL AS PERMANENT EMPLOYMENT OPPORTUNITIES WITH OUR CLIENTS, WHO ARE BASED IN SUNNY CALIFORNIA. RELOCATION ASSISTANCE WILL BE CONSIDERED.

PERMANENT

- SR. P/A - MARSHALL & ISLE
- P/A - HOGAN, ASSEMBLER
- P/A - CICS, COBOL, PROPERTY & CASUALTY BACKGROUND.
- SYST. PROGMRS - IBM M/F, ALL TYPES/LEVELS
- PA - S/38, RPG III

CONTRACT

- TELON
- DB2
- MODEL 204
- CSP
- OS2
- GENESYS

IF YOU HAVE EXPERTISE IN ANY OF THE ABOVE AREAS OR SIMPLY WISH FOR US TO FIND THAT RIGHT OPPORTUNITY FOR YOU, PLEASE CALL OR SEND RESUME TO:

D.P. SPECIALISTS, INC.
DEPT. CW
2041 ROSECRANS AVE., STE. #106
EL SEGUNDO, CA 90245
PHONE: 213/416-9846
FAX: 213/416-9003

D.P. Specialists, Inc.

PROGRAMMER/ANALYSTS

OMNI RESOURCES is an Information Systems Consulting firm with offices in Milwaukee, Madison and Green Bay. We started business in 1984 and are already the third largest Wisconsin based consulting firm, with 70 employees. In addition to providing services to many of the largest corporations in the Midwest, we are the primary vendor to the State of Wisconsin and City of Milwaukee.

We offer an excellent compensation package, including time and 1/2 for overtime, benefits that include a 401(k) with a company contribution and continuing education.

We are seeking Programmer/Analysts with at least three years of experience with any of the following:

IMS, DB2, IDMS, ADABAS, CICS, SAS, FOCUS, ORACLE, COBOL II, RPG/400, NATURAL, "C", SQL, TAL, SCOBOL, IBM, DEC/VAX, HP, TANDEM.

If you find your career at a standstill, if corporate politics or the lack of growth and income potential have been frustrating, call us or send your resume with salary history.

OMNI RESOURCES

STRENGH IN TECHNOLOGY · STRENGTH IN PEOPLE

155 E. Silver Spring Drive Suite 207
Milwaukee, Wisconsin 53217
414/332-5252 800/236-5920

131 W. Wilson St. Suite M104
Madison, Wisconsin 53703
608/255-2115
800/236-2115

2680 S. Ashland Ave. Suite 101
Green Bay, Wisconsin 54304
414/499-8232
800/236-2332

AUSTRALIA PL/1 CONTRACTS

PACT International is a leading Sydney based supplier of contract and permanent DP staff. We will arrange all visas and provide assistance for Senior A/P's experienced in PL/1 to take up assignments in Sydney. To arrange appointments with our Managing Director, Mr David Reading, in Honolulu, L.A., San Francisco between June 22/July 12, Contact Deborah Maddigan at our Sydney office.

PACT International, 77 Pacific Hwy,
North Sydney, NSW 2060
Tel: (612) 954 4800
Fax: (612) 954 4944

RSVP SERVICES

ANALYSTS • PROGRAMMERS • HW/SW

In a Slow Market, You Need A Quick Employment Service

If you have marketable skills, together with reasonable geographic and salary requirements, your resume will be on its way selectively, to our applicable contacts among our 1000+ client companies and 200+ affiliates nationwide, ***within 24 hours after we receive it.*** No cost or obligation to you, no sales pressure

Our clients seek 2 years minimum professional experience, stable work history, good technical references, and U S citizenship or green card

TO APPLY: Mail or FAX resume or call Howard Levin.

RSVP SERVICES
Dept. C, Suite 814, One Cherry Hill Mall, Cherry Hill, NJ 08002
800-222-0153 or FAX: 609-667-2606 (refer to Dept. C)

CREATE SOFTWARE IN YOUR OWN IMAGE.

Imagine an IBM 3090-600 complex so big a complete systems image is always available for development and test.

It's a reality at Northrop B-2 Division, thanks to PR/SM and a group of Information Resources Professionals who won't settle for anything but the best. Lika an MRPII system that's completely integrated with financial applications. IMS, DB2 and Oracle implementations that are setting new performance standards. And the most advanced CASE tools around.

Talk to Northrop, because we have a better system.

SENIOR SOFTWARE ANALYST

Support automated material handling systems in the manufacturing area. Analyze performance of critical components including applications software. VAX systems experience required; FORTRAN and C experience preferred. Previous exposure to automated material handling systems and/or manufacturing systems is helpful. BS in Computer Science preferred.

SYSTEMS ENGINEER ANALYST SPECIALIST

Analyze current system technology and recommend alternatives and design solutions. Must be capable of systems programming, support, and performance tuning of VAX/DEC hardware. Responsible for hardware and system software configuration, design and problem solving. A minimum 10 years of VAX/DEC systems experience preferred. BS in Computer Science desired.

DATA BASE ADMINISTRATORS

Positions are available for individuals with 8 years of experience including IMS DB/DC Applications Analyst or Administrator in an IMS/DB/DC environment. Experience with HP, Teradata, DB2, SQL and ORACLE a plus.

MVS SYSTEMS PROGRAMMERS

Install and maintain MVS/ESA operating systems and related program products using SMP/E. Must be proficient in the use of Assembly language and EXIT coding and be a solid problem determination/resolution analyst. Requires 4 or more years of IBM Mainframe experience. Knowledge of MVSCP, IOCP processes, JES2, TSO, and ISPF/PDF is required and use of ACF/VTAM is desirable.

VTAM SYSTEMS PROGRAMMERS

Maintain and enhance a large data communications network with an SNA backbone utilizing SNI and LAN gateways in support of IMS, DB2, CICS and TSO/E. Must be knowledgeable in SNA concepts, NJE, VTAM resource definition, NCP generation, SMP/E, and EXIT coding using Assembly language. Must also be proficient in problem resolutions utilizing Netview, NPM and 3725 MOSS console. Knowledge of tuning, TCP/IP and JES328X is desirable.

BUSINESS PROGRAMMER ANALYST

Challenging ground floor opportunity for a Programmer/Analyst to develop and install factory floor management systems. Successful candidates will possess a BS in Computer Science and a minimum 3 years of PL1/CICS, TSO, ISPF and PANVALET experience. IMS DB/DC and DB2 experience would be helpful. Previous assembly line application experience is desired.

IMS PROGRAMMER ANALYSTS

Challenging positions requiring 3 or more years of recent experience in an IBM mainframe environment utilizing IMS DB/DC, COBOL, MVS/ESA, TSO, ISPF, and PANVALET. Knowledge of DYL/280, DB2 and structured methods a plus.

NETWORK EQUIPMENT DESIGN ANALYST

Perform complex analysis of technical requirements and specifications necessary for the planning, design, installation and maintenance of computer and network equipment. Act as project lead and coordinate the work of assigned personnel as designated. Perform work requiring complex analysis, judgment and decision making. Some travel involved. Equipment: IBM Mainframes, HP & DEC machines, IBM PC's, Wang, Fiber Optic Equipment and Telecommunications Equipment.

NETWORK TECHNICIAN

Respond to terminal service trouble calls and take corrective action. Recommend changes to improve overall network performance. Assist in the monitoring of both the national and local data communication networks. Assist in the training of junior network technician personnel. Test Equipment: TTC Firebird 2000, 6000, & T-105, Oscilloscopes, TIMS, NETVIEW, Multimeters and Fiber Optic Test Equipment. Equipment: IBM Mainframes, HP & DEC machines, Wang, IBM PC's, Fibronics, WESCOM, Ethernet, Gateways, and Fiber Optics.

PERFORMANCE MANAGEMENT POSITIONS

Our environment consists of multiple JES2 complexes running MVS/ESA and MVS/XA. Multiple LPARS running on each 3090-600S.

IMS PERFORMANCE SPECIALIST

Support large, multiple IMS environments. Analyze transaction performance, working with DBA's and programming groups, to design and implement optimized production on-line systems. Experience with OMEGAMON, IMF, shared DASD, SAS, MICS preferred. Experience with DB2 and CICS systems a plus. Position requiring general direction only for most tasks. A minimum 6 years of experience and a BA/BS degree or equivalent is preferred.

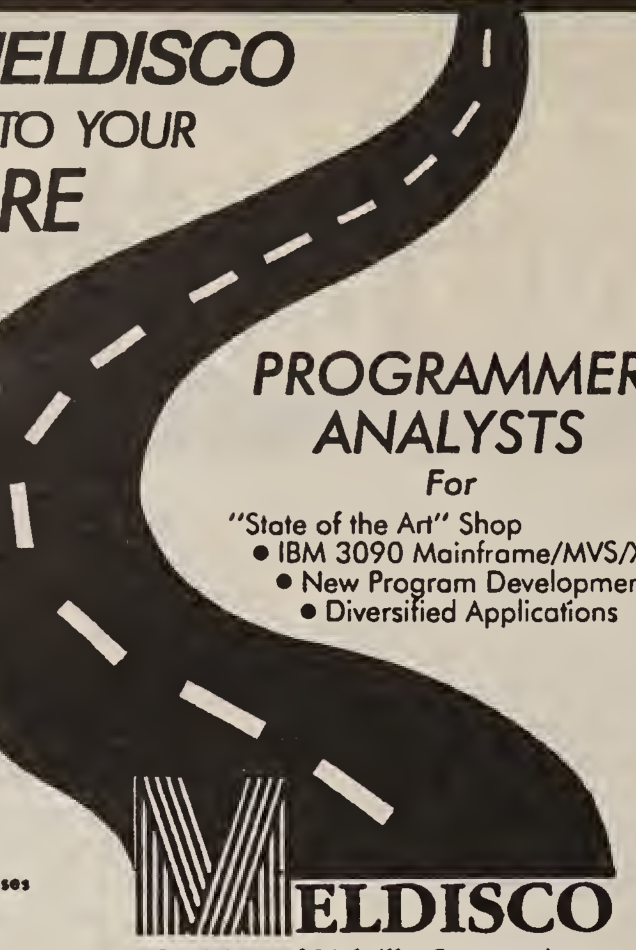
MVS PERFORMANCE SPECIALIST

Support TSO, CADAM service levels, workload and I/O balancing. Experience with Parmlib, SMF, MICS, SAS, OMEGAMON, FASTDASD, PR/SM, Expanded Storage preferred. Prior Systems Programming and 5 years of technical experience desired.

For immediate consideration, please forward your resume to: Janet Vrieling, NORTHROP B-2 DIVISION, Dept. CW2544, P.O. Box 1138, Pico Rivera, CA 90660-9977. EOE M/F/H/V. U.S. CITIZENSHIP REQUIRED.

NORTHROP
B-2 Division
People making advanced technology work

THE ROAD TO MELDISCO IS THE ROAD TO YOUR FUTURE



Meldisco, one of the largest Footwear Retailers in the Country has challenging opportunities available for programmers.

Qualified candidates will possess 2-3 years experience with:

- **COBOL**
- **CICS**
- **MVS**

We offer competitive salaries with an attractive benefits package and a pleasant work environment. Please send resumes to the attention of the Recruiting Specialist.

We will respond only to those resumes we are interested in pursuing. All responses will be made within three weeks.

NO AGENCIES PLEASE
equal opportunity employer M/F

PROGRAMMER ANALYSTS
For
"State of the Art" Shop
- IBM 3090 Mainframe/MVS/XA
- New Program Development
- Diversified Applications

MELDISCO
Division of Melville Corporation

933 MacARTHUR BLVD. MAHWAH, NJ 07430 **201-934-2425**

DEC VAX PROFESSIONALS

UNISOFT Corporation is a national consulting firm that has **IMMEDIATE** positions available in the **SUN BELT:**

P/A, S/A: HEAVY VMS, C, RMS, DBA

- Vax System management & facility operations
- Vax Utilities, Communications, All-in-1
- ORACEL, INGRES, Rdb, DATABASE DESIGN

If you require **CHALLENGE** and **TOP DOLLARS**, Please call, fax or send your resume to:

David S. Houser
National Sales Manager

UNISOFT Corporation
P.O. BOX 13666
RTP, NC 27709-2274

TEL: (919) 544-7111 FAX: (919) 544-2158

MIS PROFESSIONALS

CICS
Several openings in retail sales, human resources and healthcare applications.

CICS & BAL
Knowledge of internals needed for development work.

CICS & VTAM
Manage the telecommunications of this Long Island firm.

WANG/COBOL/IBM
Strong insurance background required. Opportunity to learn AS400.

INFORMIX/INGRES
Excellent communication skills as well.

P/A/PL/1/
5 yrs Big Conglomerate in Connecticut
Experience with VM/CMS & DBMS. Brokerage background will help.

Call Bob

Exec-computer
1440 Broadway, New York, NY 10018
(212) 944-9250 or Fax (212) 869-2846
SERVING NEW YORK METRO AREA SINCE 1977

PROGRAMMER ANALYST

Computer Management Sciences Inc., an "Employee Owned" Software Services company, is seeking technical professionals in the US and Australia.

Your two or more years of experience with any of the following can lead to a rewarding career.

• AS400/COBOL
• IDMS/ADSO & DB2
• DEC/VAX-VMS
4 GL PRODUCTS
(NOMAD, ORACLE, SQL)
• IMS DB/DC & DB2
(MANUFACTURING, TELEPHONY, FINANCIAL)
• DB2/SQL • PACBASE
• IBM SYSTEMS PROGRAMMERS

For IMMEDIATE RESPONSE or more information call 1-800-552-CMSI or send resume in confidence to;

Computer Management Sciences, Inc.
Professional Staffing
CW690
8663 Baypine Road
Jacksonville, FL 32256

RESEARCH TRIANGLE OPPORTUNITIES

Currently recruiting experienced computer pros with background in any of the following: IBM COBOL; CICS; IDMS; IMS; ADS/O; ORACLE; INGRES; DB 2; UNIX; HOGAN; ASSEMBLER; AS400; DEC/VAX/VMS; ORACLE/C; CIM; POS; MSA; Financial; Mfg.; Banking; Insurance; MVS, VM, NCP/VTAM or CICS Systems Progrs; DEC/VAX Systems Mgrs; TANDEM; Adabas/Natural; PC LAN; Database Analysts. Partial lising of local, regional & nat'l fee paid positions. Call or write:

The Underwood Group, Inc.
3924 Browning Pl., Suite 7
Raleigh, NC 27609
(919) 782-3024
FAX (919) 783-0492

---

50 Ways To Leave Your Company

In today's world of mergers and buyouts, your future with a company can be uncertain. You owe it to yourself to take charge of your career. There can be over 50 companies at TECH FAIR® where you can meet and discuss the high tech marketplace.

TECH FAIR offers an excellent opportunity for engineers and computer systems professionals to meet face-to-face with high technology companies who have job openings that need to be filled immediately.

At TECH FAIR, you can find out what you're worth, explore new career possibilities, get a closer look at projects and position openings, all in an informal, no pressure atmosphere.

So, come to TECH FAIR and find 50 ways to leave your company.

JUNE TECH FAIRS

June 7-8 (AFCEA Event)
Ramada Renaissance Techworld, Washington DC
2PM-7PM on June 7, 12PM-5PM on June 8
June 11-12
Airport Hilton, Minneapolis, MN
3PM-8PM Both Days
June 25-26
Grand Kempinski, Dallas, TX
3PM-8PM Both Days

Free Admission

TECH FAIR® BPI
THE NATION'S #1 JOB FAIR FOR ENGINEERING, SYSTEMS & SOFTWARE DEVELOPMENT PROFESSIONALS
TECH FAIR is a Trade Mark of Business People Inc
Sponsored by BPI, 2965 Multifoods Tower, 33 South Sixth Street, Minneapolis, MN 55402
For information call (612) 370-[illegible] We are not an employment agency

---

$$ REBATE $$

Immediate Openings Contract/Permanent

- **S/36 TO AS/400**
- **AS/400**
- **S/38 RPG III**
- **S/38 COBOL**
- **DB2**
- **IMS DB/DC**
- **CICS**
- **MSA**
- **IDEAL**
- **IDMS ADSO**
- **FOCUS**
- **VAX ACMS, CI**
- **ULTRIX/UNIDATA**
- **SYNON**
- **TPF**
- **UNIX "C"**
- **HP 3000**
- **DBA DB2**
- **SYS PROGS IBM & VAX**

Call or Send Resume to

DP RESOURCES, INC.
PO Box 5057
Burlington, NC 27216
(919) 222-8063
FAX (919) 570-1512

Hardcore Software People

We need analysts/programmers for IBM or DEC environments. According to Inc. magazine, WTW is #130 of America's fastest growing companies; join our team and earn what you're worth. WTW is a national software consulting firm offering excellent salary and benefits and the opportunity to position yourself for success.

Send resume immediately or call:

Attn: Carol English
Wesson, Taylor, Wells
PO Box 12274
RTP, NC
27709

1-800-833-2894

WTW SOFTWARE CONSULTING SERVICES

Wesson, Taylor, Wells is an equal opportunity employer

SENIOR P/A CONSULTANT

Outstanding career opportunity w/major consulting firm. Excell growth potential & compensation package! Exp w/either IMS/DB/DC, DB2 &/or CICS is an initial requirement along w/a minimum of 2 yrs. exp. Please call Conni Bullock at 212-736-9429 or send resume to: Financial Resources, Dept E.S. 15, 71 5th Ave., 5th Floor, NY,NY 10003

◆ Programmer Analyst

Connecticut based Health Insurance Company has opening for a Programmer Analyst. Must possess good communication skills. Experience should include BASIC language, data concepts and knowledge of micro-computers. PICK/UNIX experience is a plus. We offer a competitive salary and growth potential. Interested applicants, send resume to:

Attn: Human Resources Dept.

OXFORD HEALTH PLANS
320 Post Road, Darien, CT 06820

an equal opportunity employer M/F
NO AGENCY CALLS PLEASE ◆

SYSTEMS PROFESSIONALS
FULL TIME POSITIONS

ONLINE/REALTIME "C" PASCAL R & D Environment UNIX/VMS/MSDOS Transaction Processing	30-85K
VAX, VMS, UNIX, SYBASE Fin. Info., Workstation Dev.	30-60K
IBM MAINFRAME COBOL CICS and Database, New Dev. F/X sys.	30-80K
OS/2, Presentation Mgr Front Office, Analyst sys., Analytical Systems.	30-70K
TANDEM TAL Heavy Dev., Market Data	40-60K

Call Dave

EXEC-COMPUTER
1440 Broadway, New York, NY 10018
(212) 944-9250
SERVING NEW YORK METRO AREA SINCE 1977
Sorry No Entry Level or Sponsorships

"And the Southeast"

The South is rising again with career opportunities in the growth center of the nation. The professional challenges and quality of lifestyle cannot be surpassed

AS/400, S/38	DEC VAX
DB2/CICS	C/UNIX
MVS/ESA	PC/LAN
ORACLE	IMS/IDMS
UNISYS	TANDEM

FOCUS
EDP Recruiters

3 Corporate Square, Suite 340-C
Atlanta, Ga. 30329 (404) 321-5400
Member EDP Resource Group
Positions Nationwide

Programmer

Wanted, C programmer to work in IBM PC compatible environment. Successful candidate will work on diverse data gathering and other projects, utilizing RS232/485 architecture. Hardware knowledge is a must, and will require the ability to use different modems, printers and monitors from within the software. Located in Princeton, New Jersey area. Excellent benefit package. Call (609) 466-0050, request information on "C" programmer position.

Senior Software Engineer: Responsibility for the design and development of new software products on a variety of hardware platforms including 80386 processor based systems. Responsibility for designing and implementing multiuser access layer and network interface layer of multitasking, multiprocessor database system. The above program utilizes the "C" advanced programming language and 80386 protected mode assembler. B.S. in Computer Science plus 2 years in the job offered or a Master's Degree in Computer Science in lieu of 2 years experience. Must have knowledge of "C" and 8086 Assembler languages, parallel and distributed processing. 40 hrs/wk 9-5, $35,000 per year. Please send 2 resumes to: J.O. #00658, Commonwealth of Massachusetts, Department of Employment and Training, Special Programs, 1st Floor, 19 Staniford Street, Boston, MA 02114.

CONSULTANTS WANTED

MVS/SMS
VTAM/NETVIEW
MAPPER • EASEL
IMS/MANUFACTURING
METAPHOR/DIS
TANDEM/PATHWAY/SQL
VM/CMS/FOCUS
DB2/CICS
AS 400
DEC WINDOWS

1-800-843-9119
FAX ANY TIME 212 764-3363

RMS COMPUTER CORP
1212 6TH AVE.,
17TH FL., NYC 10038

Recruit qualified computer and communications professionals with the IDG Communications Computer Careers Network of five leading computer newspapers.

Call
Lisa McGrath at:
(800) 343-6474
for more details.

IS YOUR PRESENT JOB GOING THE DISTANCE?

IF NOT, SWITCH TO TITLEIST.

Titleist, a progressive golf industry leader in the area of product development, manufacturing, and marketing, offers a unique and challenging opportunity at our world-wide headquarters located in New Bedford, MA.

Programmer Analyst

Excellent opportunity for an IBM System 36 or 38 programmer to begin programming on the new IBM AS/400. Reporting to the Systems and Programming Manager, the successful candidate will have an integral role in the development and maintenance of business computer systems, in a fast-paced manufacturing environment. Will be responsible for working with end users, as well as programming. In addition to being part of a team utilizing the latest in IBM business technology, the successful candidate will be eligible to participate in an extensive and progressive cafeteria style benefits program including; medical, dental, 401(k), tuition assistance, dependent care and much more.

Requirements for this position include: 2-3 years of RPG programming experience in an IBM System 30's environment (System 38 a strong plus); familiarity with business programming applications; capable of working with minimal supervision in a multi-task environment; excellent verbal, written and communication skills.

Please forward your resume and salary requirements in confidence to:

Titleist
ACUSHNET COMPANY

Titleist Golf Division
Acushnet Company
Human Resources Department
P.O. Box E 916
New Bedford, MA 02742

An Equal Opportunity Employer, M/F

DATA BASE MANAGEMENT, INC.

THE FUTURE BELONGS TO THOSE WHO GET THERE FIRST.

As an experienced, career-oriented computer professional, you know that the future belongs to those who are most familiar with leading-edge technologies—DB2, SQL, 4GL, AD/Cycle, CASE and more.

We're DBMI, one of the nation's leading suppliers of information systems engineering, consulting and training to government and Fortune 500 companies. Together with American Management Systems (AMS), we represent over 2700 permanent employees in 23 cities and revenues exceeding $225 million. We've seen the future and we need you to help us claim it.

If you are a Programmer/Analyst, DBA, DA or Systems Programmer with experience in any of the areas listed, we want to talk to you today about where we'll both be tomorrow.

- **DB2**
- **IMS**
- **CICS**
- **CASE (IEF,IEW)**
- **JAD**
- **CSP**

We'll provide you with an excellent salary and benefits package, outstanding cash bonuses, training in the latest developing technologies, a variety of new and exciting challenges, and opportunities to travel.

For an informal discussion of your objectives, or to arrange for a personal interview, call **Jim Quinn at (203) 646-3264.**

Data Base Management, Inc.
300 Chapel Road
Manchester, CT 06040.
An Equal Opportunity Employer

DBMI
An AMS Company

Hartford, CT Wilton, CT
Alexandria, VA Richmond, VA Dallas, TX

TELON DB2

Get ahead with the company that's already there. Keane is clearly out in front. Our stock increased its value 218% last year. Forbes Magazine rated us one of America's best small companies. We've expanded into new territories, thanks to aggressive acquisition strategies. And our computer software consulting services are in demand from select Fortune 1000 manufacturers, major financial and insurance companies, service companies and government agencies. If you're a professional ready to get ahead, get in touch with Keane.

We have 20 offices from Maine to Florida and throughout the Midwest. In addition to TELON and DB2, Keane is continually looking for technical professionals with 2-5 years' experience in any of the following areas:

IMS • COBOL • AS400 • PL/1 • ADABAS • SYSTEM 38 • FOCUS ASSEMBLER • IDMS • VAX • CICS • UNIX • C

Keane offers all employees an opportunity to grow with the leading project-oriented computer software consulting company in the US; superb technical, management and project management training. Competitive salaries, comprehensive benefits including life and health insurance, 401K Plan, tuition reimbursement, and vacation condominiums. For more information, call Greg Alleyne at 1-800-899-5326; or send your resume to Keane, Inc., 36 So. Charles St., Suite 2350, Baltimore, MD 21201. An equal opportunity employer.

Other positions available in: CT, MA, MD, ME, MN, NH, NJ, NY, IL, PA, RI, OH, FL, GA.

ONE COMPANY.
ENDLESS POSSIBILITIES.

KEANE

A Terrific Opportunity

Computer Consulting Group, one of the Southeast's fastest growing contract programming and consulting firms, has immediate openings for talented Programmer-/Analysts with 2 or more years experience. Excellent salary & benefits package. We're especially seeking

NATURAL/ADABAS
CICS/COBOL
IMS DB/DC
IDMS/ADSO
TECH. WRITERS
LIFECOM
DB-2
SYS. PROGRAMMER
VAX/FORTRAN/COBOL
UNIX/C
PL-1/COBOL
VAX/C/INGRES
AS400/COBOL
I-CAD
IDEAL/DATACOM

Computer Consulting Group
Contract Professional Services

Research Triangle Area
4109 Wake Forest Rd
Suite 307
Raleigh, NC 27609
1-800-222-1273
(803) 738-1994
FAX (803) 738-9123

PROGRAMMER ANALYSTS
CONSULTANTS NY/NJ

- IMS to DB2 w/CICS
- C with IMS
- MVS, VM, UNIX Planning
- PL/1 IMS w/CICS
- Data Modeling/Analyst
- UNIX Security/Management
- UNIX Admin/Tester
- Sr. UNIX data comm (TCPIP)
- Sybase X Windows UNIX/C
- ORACLE Pro*C
- IDMS batch & ADSO
- C++
- "Systematics" Software
- DB2 Design
- COBOL DB2 w/wo CICS
- Sr. STRATUS PL/1 or C
- INFORMIX 4GL
- FOCUS w/TERRADATA
- UNIX/C OSI Standards
- EXCEL

AZTEC

Call or send resume to GRANT KEAST

Aztec Consulting Services, Inc.
530 Main St, Dept CW 618, Ft Lee NJ 07024
(201) 461-7200 **(212) 307-7259**

Great CONSULTING Assignments! and Exceptional FULL TIME Opportunities

Call & send your resume to

MIMI
SIMON ASSOC.
90 West Street, Suite 1105
New York, NY 10006

(212) 406-1705
Fax # (212) 406-1768

COMPUTER PROGRAMMER ANALYST

The NYC Police Dept. seeks programmer with the following qualifications: VAX/VMS experience with knowledge of IBM PC hardware/software; knowledge of Relational Database and Structural Query Language and the ability to apply these concepts across different hardware platforms and software packages; knowledge of BASIC (DEC), ANSI C or PASCAL programming languages. Applicant must be comfortable with current LAN/WAN technologies. An Associate degree including at least 21 credits in computer science or computer curriculum required + 2 years full-time paid computer programming experience. Salary: $29,000-$41,000. EOE. Send resumes to: NYC POLICE DEPT., Motor Transport Division, 53-15 58th Street, Queens, N.Y. 11377. Attn: Peter Kott.

COMPUTER SPECIALISTS . . . OUR ONLY SPECIALTY

Experienced in Engr'g or Programming? We match you to the job *you* want. All USA Locations/All fees paid. Mail resume or call to discuss your career goals

TECH SUPPORT
IBM & DEC

SOFTWARE
C UNIX Assemblers

PROG/ANALYSTS
IBM M Frame & Minis
CICS RPG COBOL Databases

HARDWARE
Analog Digital

COMMUNICATIONS
Voice & Data

HAMILTON
TECHNICAL PERSONNEL INC
P.O. Box 369
West Hurley, N.Y. 12491
(914) 679-4050

PROGRAMMERS/ANALYSTS
GREAT OPPORTUNITIES

IMS DBA's, DL1, DB2 a plus	45-70K
DB2 DBA	50-70K
MVS Systems Programmers	40-65K
CICS Systems Programmers	40-65K
VAX/VMS Systems Programmer	40-70K
VAX/VMS "C", RMS, ORACLE	45-70K
VAX/VMS INGRES, ORACLE SYBASE	45-70K
Realtime "C" and Assembler	35-65K

Call/Send Resume to Mike: Tel: (212) 944-9250
Fax: (212) 869-2846

Exec-Computer, 1440 Broadway - Suite 1652
New York, N.Y. 10019

ATTENTION
CONTRACTORS, SYSTEMS AND PROGRAMMING PROFESSIONALS

Long term contracts available for candidates with at least two (2) years experience in the following:

- ORACLE
- INGRES
- DEC, COBOL
- DB2, NATURAL
- INFORMIX
- UNIX, C

Please Send Resume in Confidence to:

DP PROS INC.
P.O. Box 2229 • Burlington, NC 27216
Phone: (919) 222-8030 (919) 227-6274 (FAX)

BENSON, DOUGLAS
& ASSOCIATES, INC.

Computer Professionals

Our business continues to grow! Currently operating in seven states on the east coast - **WE ARE STILL EXPANDING.** With two or more years experience in any of the following disciplines you may qualify for more than just a coding assignment.

- **IBM/COBOL, IMS DB/DC, TRANSFORM, DB2, CICS, LIFE 70**
- **S/38, AS/400, COBOL, RPG III, IBM PCs, MS/DOS**
- **VAX/VMS - ALL PLATFORMS**
- **HP 3000, 9000, 1000 - COBOL, POWERHOUSE, SPEEDWARE, MM/3000, PM/3000, AMAPS, MOMS, ASK, JOBSCOPE**
- **TECHNICAL WRITERS - BOOKMASTER, DRAWMASTER - (SERIES)**
- **QA/SOFTWARE TESTING, TEST PLANS, SCRIPTS (MANUAL)**
- **MACINTOSH (SILVER-RUN), MACDRAW**
- **ORACLE, INGRES, SYBASE, X WINDOWS, AI**

We encourage growth with challenging, authoritative assignments. For immediate consideration, please call **Jim Hash** or **Bill Hood** at (919) 467-3357 or (800) 525-2927. Or send resume to BD&A, 113 Edinburgh So., Suite 104, Cary, NC 27511, ATTN: Jim Hash or FAX a copy to (919) 467-7688

An Equal Opportunity Employer

DEVELOPMENT SPECIALISTS

BFR Systems, a recognized forerunner providing a variety of network services seeks individuals with expertise in the following areas:

- **UNIX**
- **VMS**
- **SUN (C++/X WINDOWS)**
- **C/IMS**
- **STRATUS**
- **DBMS (ORACLE/INFORMIX/SYBASE)**
- **DB2/CASE**

BFR provides competitive salaries, vacation, merit bonuses, 401k, profit sharing, full health & life insurance. For prompt consideration, please call or write to:

CATHY WARSHAW
BFR SYSTEMS
31 CLYDE RD, SOMERSET, NY, 08873
201-873-1200 FAX: 201-873-1307

BFR
SYSTEMS

★ *VTAM/MVS INTERNALS EXPERTS* ★

1990 SYSTEMS SOFTWARE DEV. CO. MAJOR INTERNATIONAL EXPANSION • $45K-$210 • SIGN-ON BONUS • STOCK OPTIONS • FULL RELOCATION • FLEX-TIME • SPORTS CLUB • PRIVATE OFFICE • 401K RELAXED ENVIRONMENT AND ATTIRE

★ PRESIDENT ★
★ V.P. SUPPORT OR DEV. OR MARKETING & SALES ★
★ SYSTEMS SOFTWARE DEVELOPERS & SYSTEMS ENGINEERS ★

The majority of S/W devel. is done in So. Cal. However, a major Nationwide & International expansion as well as the possibility to 'TELE-COMMUTE' FROM HOME part time are all in the plans for 1990. We are seeking several experts with 3 yrs RE-ENTRANT BAL & MVS, VTAM, DB2 or CICS INTERNALS to help Design, Install or Support the New 1990's Systems S/W Product lines. Several traveling positions exist for instructors to live anywhere in the USA & TEACH CICSor DB2 Perf. Tuning & DataBase Design.

DB2, VTAM, CICS or VM INTERNALS • RE-ENTRANT BAL • VTAM APPS • "C" • 3270 LINE CODE AUTOMATED OPERATIONS • NETWORKING • DBMS ARTIFICIAL INTELLIGENCE

California • New York • Washington • Virginia • Colorado • Japan

CALL WAYNE CARTER TODAY
213-276-6339 FAX 658-1599
9100 WILSHIRE BLVD #442BEVERLY HILLS, CA 90212

PROGRAMMER/ANALYSTS

Major Manufacturer in Stamford, CT looking for P/A's to work on Sales and Marketing system. IBM, COBOL, MVS, JCL, a must. CICS and DL/1 a plus IBM PC, CLIPPER and/or dBASE. . . .35-50K

DB2 Specialist- Physical and Logical, Data Base Design Skills. Must be willing to travel. Good Corporate Image and User Interface Skills TO 75K

UNIX-LANS Specialist - Experience with handling workstations. Must have a variety of languages. LANS and/or TCP/IP Required.

PA's - 2+ yrs. Experience with COBOL, CICS, & IMS for Major Conglomerate in Northern, NJ 35-50K

Call Lois at:

EXEC-COMPUTER
(212) 944-9250
1440 Broadway, New York, NY 10018
or Fax Resume - (212) 869-2846

Software Engineer - Database Systems Development: Modify the existing design and implement concurrency control aspect of database products to communicate with UNIX systems in C language; Develop cost efficient data structures to implement concurrency control algorithm in database systems; Implement critical routines utilizing assembly language to improve system performance; develop and implement optimization techniques to process the query in distributed systems. M.S. Degree in Computer Science required plus two years experience in the job offered or two years of graduate research experience in concurrency control alogorithm for database systems in lieu of 2 years experience. Must have knowledge of integrated concurrency control algorithm, distributed database systems and data structures; VAX and PRIMOS operating systems and C, PASCAL, FORTRAN, COBOL and PRIME 400 ASSEMBLY Languages. 40 hrs/wk 9-5, $41,000 yr. Please send 2 resumes to: J.O. #00659, Commonwealth of Massachusetts, Department of Employment and Training, Special Programs, 1st Floor, 19 Staniford St., Boston, MA 02114.

IDMS ADS/O

IDMS and ADS/O are in great demand with my clients in TN, SC, NC, VA, FL and KY. We have many openings for Programmers & Prog/Analysts with 0-5 yrs. experience in IDMS, and salaries from $28-45K. I also need a MANAGER OF APPLICATIONS PROGRAMMING with IDMS, 4 yr. degree and mfg. applications experience. Salary to $70K+ bonus. I also need several IDMS Data Base Analysts with salary to $50K.

Contact **JIM BOSTIC, PHILLIPS RESOURCE GROUP, P.O. Box 5664, Greenville, SC 29606** or call 803/271-6350 (D), 803/292-1181 (E), or 803/271-8499 (FAX).

PROGRAMMER/ANALYSTS
& SYSTEMS PROGRAMMERS

FOR CAROLINAS AND SOUTHEAST

Numerous opportunities exist for on-line and data base applications P/A's as well as systems programmers and DBA's. Fee Paid. Please call or send resume to.

Keith Reichle, CPC
Systems Search, Inc.
203 Heritage Park
Lake Wylie, SC 29710
803/831-2129

(Local lo Charlotte, NC)

HOW'S THE WEATHER?

Bateman Inc. is conducting a nation-wide search for a few chosen professionals, who are interested in living in the beautiful surroundings of the San Francisco Bay Area or on the sunny beaches of Southern California. We need to talk to you if you possess any of the following:

- 3 years + ACP/TPF
  Sr. P/A's and P/L's to 65k
- 3 years IDMS ADS/O
  Sr. P/A's to 50k
- 3 years CICS DL/1
  Sr. P/A's & S/A's to 48k

All offering excellent bennies; including full relocation, retirement & profit sharing plans.

Contact:

Bateman Inc.
1501 Main St., Venice, CA 90291
(213) 399-4300 (600) 562-7533
FAX 213-399-6677

COMPUTER PROGRESS UNITED
$40,000 to $60,000

We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for **P/A** in **Kentucky, Ohio, Indiana,** and **Tennessee. We are the DB2 Specialist!**

DB2/SQL
IMS ▪ CICS

Send resume or call:
Computer Progress United
12730 Townepark Way
Louisville, KY 40243
(502) 245-6533

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you large numbers of professionals who work in your industry.

When you're recruiting computer professionals, it's often important to find ones with experience working on systems specific to your industry. From manufacturing to banking, healthcare to insurance, Computerworld reaches the right people in every major industry.

Number of Computerworld Readers with Experience in Key Industries (Entire Career)

Job Industry	of Computerworld's Audience . . .
Computer Vendor and Consulting	147,897
Computer Manufacturer	79,521
large-scale computers	37,110
medium-scale computers	45,938
small-scale computers	33,851
personal computers	47,758
technical workstations	24,889
Software Vendor	130,589
for large-scale systems	57,561
for medium-scale systems	74,967
for small-scale systems	61,274
for personal computers	76,787
for technical workstations	26,379
Non-CPU Computer Products Manufacturer	36,994
VAR/dealer/retailer	27,557
DP Service Bureau/contract DP Services	53,077
Consulting/planning	86,677
Manufacturer (not computers)	168,664
Insurance	52,910
Healthcare	64,729
Banking/financial Services	97,953
Government - federal/state/local	110,399
Business Service (except DP)	40,108
Communications Systems	28,913
Public Utilities	54,364
Transportation	26,031
Wholesale/retail Trade	111,095
Education	125,184

SOURCE: Skill Survey of Computerworld's Audience, May 1989.

To place your ad regionally or nationally, call John Corrigan, Classified Advertising Director, at **800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD
The weekly newspaper of record for computer professionals.

Westinghouse Idaho Nuclear Company, Inc.

HP 3000 Programmer Analyst

We are seeking a candidate with a BS Degree in Information Systems, Computer Science, or equivalent degree and five to seven years HP3000 experience using COBOL, IMAGE, and VIEW. Some IBM mainframe and microcomputer working experience is desirable. Additionally, the candidate must have a strong working knowledge of structured development methodologies and possess proven interpersonal, analytical, and design/development skills.

The successful candidate will be responsible for analysis, design, programming and documentation for new and existing business applications.

All applicants must have, or qualify for, a DOE "L" security clearance.

For immediate consideration please send resume with copy of advertisement to: Ace Ballard

Westinghouse Idaho
Nuclear Company Inc
P.O. Box 4000, Code CW
Idaho Falls, Idaho 83403

Equal Opportunity Employer
U.S. Citizenship Required.

SYSTEMS ANALYST/PROGRAMMER

(Work Location: Las Vegas, Mercury & Tonopah, Nevada)

These positions require a bachelor's degree in MIS, Computer Science or related fields. Must have two or more years of applicable experience in large system development and database technology. A solid foundation in structured methods of design and programming required. COBOL, FORTRAN, and Smartstar programming in a VAX environment is preferred. Should be able to communicate effectively with business and scientific people.

SYSTEMS ANALYST/PROGRAMMER

(Work Location: Las Vegas & Mercury, Nevada)

These positions require a bachelor's degree in Computer Science, Engineering or equivalent experience plus three or more years of experience in technically related computer areas. Should have experience with Digital Equipment Corporation (DEC), VAX systems and networking products. Should be able to interact with management, staff and vendors in a large network and computer end user community. Implementation of application development tools such as database and 4th generation languages is desirable.

EQUAL OPPORTUNITY EMPLOYER-M/F
Liberal Fringe Benefits
Replies Held Confidential
Must be a U.S. Citizen
Drug/alcohol screening test required

SEND RESUMES TO: Trudie L. Rainey
Recruiting & Employment Administrator
Reynolds Electrical &
Engineering Co., Inc.
Post Office Box 98521
Las Vegas, NV 89193
Tel: (702) 295-1900

TPF PROGRAMMERS

ASSIGNMENTS IN EUROPE, FAR EAST AND U.S.

Bedford Associates, Inc., a subsidiary of British Airways, is a leading international information technology service firm specializing in management consulting and the development of high performance on-line transaction systems. We do business all over the world.

What you'll need is at least 2 years of **TPF Applications** or **Systems** experience, and some airline knowledge... along with the initiative and imagination to succeed in an innovative technical environment.

To find out about our generous compensation and benefits packages, including overseas living allowances, Please Fax your resume immediately or call collect Today. Personal interviews will follow initial screening.

Patsy Bauer
Recruiting
Bedford Associates, Inc.
101 Merritt 7
Norwalk, CT 06851

(203) 846-6251
Fax: (203) 846-1487

Bedford Associates Inc.

An Equal Opportunity Employer

ROBERT HALF

R-H ®

INFORMATION SYSTEMS SPECIALIST

Catching a Star is a Matter of Knowing Where to Look.

RPG III P/A

Several hi tech companies based in San Jose, CA are in need of 20+ RPGIII professionals w/financial, distribution or mfg experience. Excellent career growth opportunities.
$60K SJC102

CICS INTERNALS SPECIALIST

New Seattle division of national software vendor is building development & performance monitoring tools for CICS. Systems and applications programming exp required. Exciting growth oppt'y.
$50+K SEA102

VAX COBOL P/As

Major San Francisco based company seeks seasoned DEC VAX VMS COBOL programmer analysts with 2+ years financial and/or distribution systems exp. Knowledge of SYBASE or other SQL database a plus.
$40K SFO102

DB2/ORACLE

Nat'l consult firm seeks indivs w/3-10 yrs, DB2/ORACLE for SR's, mgrs & 10-15 yrs BIG 6 consult mgmt exp for managers/partners. Exc. benefits, full relo. Jobs in Atl, Balt/Wash, Calif. Call San Diego for details.
$50-120K SAN102

PROG/ANALYST

Work at the Beach in Los Angeles! Highly visible direct mail co seeks P/A with IBM Mainframe Assembler/VM/VS1 and Direct Mail experience.
$40+K LAX100

JD EDWARDS

Several Houston area businesses are looking for programmers and system analysts with a good working knowledge of JD EDWARDS software. Experience with IBM midrange systems is required, System 38 or AS400 is preferred.
$45K HOU102

PROG/SYSTEMS ANALYST

Leading office products manufacturer is seeking experienced EDI applications analyst. Exp w/COBOL, PANVALET, CICS & IBM Mainframes is a must! Database exp. a plus.
$35K OKB103

SR PROGRAMMER/ANALYST

Electrical manufacturing company in western suburbs of Chicago seeks P/A with 5+ yrs experience in manufacturing with expertise in LAN, Revelation, and RPG II to lead migration of mainframe applications to PC networks.
$40K OKB104

SYSTEMS/ANALYST

Great opportunities exist w/outstanding Chicago firm beginning a major DEC/VMS development. Must have min. 4 yrs exp w/systems configurations, capacity planning, feasibility studies, system timing & performance analyzing in a DEC/VMS environment.
$57K CHI104

CASE Specialist

Hartford area firm seeks CASE specialist for hands-on role in exciting new projects. Opportunity to have major impact in industry leader. Hi growth, excellent benefits, full relo.
$40-50K HTF103

SENIOR P/As

Great opptys in Minnesota for HP3000/Powerhouse professionals. Req's 3-5 yrs exp. & exc communication skills. Dynamic team environment. Exc growth potential!
$40K BLO102

P/A

Major Texas corporations require your development skills at multiple locations. Proficiency with COBOL, ADABASE, NATURAL and MVS/XA... Excellent compensation. Dial RH Job Board Modem 214/987-1957.
$45K DFW102

P/A - S/A - P/L

Escape to Wisconsin! Several FORTUNE 500 Manufacturing firms have growth related MAINFRAME openings. Two plus years MVS COBOL required with at least one of the following: CICS, IDMS, 4th G.L. Manufacturing environment a must. Full Relocation.
$35-50K MKE100

IBM CICS & RPG III PROFESSIONALS

Top Robt. Half Phila/Del Valley clients are staffing new development projects in IBM VM, MVS, and AS/400 environments. Outstanding positions exist for programmers through Team Leaders with 2+ years of IBM COBOL CICS or RPG III exp.
$50+K PHL102

P/A through S/A

With strong Cobol skills. Large national company seeks aggressive self-motivated individual. Background in CICS or IDMS a plus. Call Southfield, MI office for details.
$30-43K STF104

AS400 COBOL

Growing manufacturing company seeks Systems Analyst. MRP or MAPICS experience preferred. Call Southfield, MI office for details.
$40K STF105

SYSTEM ANALYST

Multi-Million Florida Corp with dual AS400 currently seeking several professionals with JD Edwards Software. Your background must include S/38 or AS400, RPGIII. Excellent career oppty.
$47K MIA100

- Call the Robert Half office nearest you -
(please refer to the underlined six digit job code)

California
Los Angeles
(213) 386-6805
FAX (213) 487-0826

San Diego
(619) 291-7990
FAX (619) 296-8784

San Francisco
(415) 434-1900
FAX (415) 434-0705

San Jose
(408) 293-9040
FAX (408) 293-1509

Connecticut
Hartford
(203) 278-7170
FAX (203) 278-0320

Florida
Miami
(305) 447-1757
FAX (305) 445-2474

Illinois
Chicago
(312) 616-8200
FAX (312) 616-1155

Oakbrook
(708) 571-7074
FAX (708) 571-0405

Michigan
Southfield
(313) 358-2300
FAX (313) 358-0941

Minnesota
Bloomington
(612) 893-9585
FAX (612) 893-0833

Pennsylvania
Philadelphia
(215) 568-4580
FAX (215) 561-4434

Texas
Dallas
(214) 363-3300
FAX (214) 373-7480

Houston
(713) 623-4700
FAX (713) 623-6782

Washington
Seattle
(206) 624-9000
FAX (206) 624-5093

Wisconsin
Milwaukee
(414) 271-4253
FAX (414) 271-7836

Wauwatosa
(414) 771-4110
FAX (414) 771-5094

© 1990 Robert Half International Inc.

SUNBELT & ATLANTA
$25,000 to $95,000
IDMS/ORACLE/DATACOM/IMS/DB2
VAX/MAPICS/FOCUS/SYS38/AS400
TECHWRITERS/DP SALES/TANDEM

Need Programmers, Programmer/Analysts for Full-Time and Consulting Positions in IBM Shops. Relocation Expenses Paid. Send resume to:

Jim Heard, EDP Consultants, Inc.
3067 Bunker Hill Road, Suite 202
Marietta, Georgia 30062

24-HOUR FAX: 404-973-4052
PHONE: 404-971-7281

CONSULTANTS

Nationwide Opportunities
OS/2 Presentation Manager
(Dev. - long term)
X-WINDOWS/DEC-WINDOWS- C/C++
VAX SYSTEMS PROGRAMMERS
AIX/UNIX/ULTRIX
IDMS ADSO
ADABAS/NATURAL
ORACLE/INGRES/RDB
OMNIS

THE REGISTRY
National Division
8260 Greensboro Dr.
McLean, VA 22102
1-800-367-9119
(703) 790-8467 Fax

AS/400 S/38

GET TO THE HART OF THE BUSINESS...

...With Whittman-Hart, the largest diversified technical services company (dedicated strictly to the AS/400 and S/38 systems) in the country. Providing technical support to many of the top Fortune 20 companies in America, we are the consulting experts, committed to mastering technologies, attending to details and creating solutions. Our accelerated growth and phenomenal success has created a need for talented Data Processing PROFESSIONALS to share in a future of significant challenge and reward in a highly progressive team environment.

We currently require individuals with 2+ years solid System 38, RPGIII, COBOL experience and proficiency in any of the following:

- **Technical Consulting**
- **Design**
- **Education & Training**
- **Data Communications**
- **Project Management**
- **Product Development**

POSITIONS ARE CURRENTLY AVAILABLE IN CHICAGO, LOS ANGELES AND INDIANAPOLIS.

Get to the HART of challenge and reward at Whittman-Hart. We offer one of the finest compensation packages in the industry, including high earning potential, project diversity, incentives, paid insurance coverage, relocation allowance and other impressive benefits. Please send your resume in strict confidence to: **Jared Bobo, Manager of Recruiting, Whittman-Hart, INC., 377 East Butterfield Road, Suite 425, Lombard, IL 60148. (708) 971-2270.** Equal Opportunity Employer M/F.

Whittman-Hart

The Leader in the Midrange Solutions.

Immediate Openings For TPF Professionals.

HYPERION W.W. & Associates has been providing top quality TPF consulting and contract services for years. And with offices in Amsterdam, Dallas, Singapore and London, our experience spans the globe.

We now have immediate openings for qualified professionals with expertise in airline applications. Applicants should be extremely quality conscious, reliable and professional.

Assignments are available to qualified applicants in a wide variety of locations.

For information on immediate openings in the United States, call our Dallas office at 1-800-992-4873.

HYPERION W.W. & ASSOCIATES
Amsterdam • Dallas
London • Singapore

4004 Beltline Road, Suite 150
Dallas, Texas 75244
VOICE: 800-992-4873
FAX: 214-980-7712

HYPERION

DISNEY

INFORMATION SERVICES WALT DISNEY ATTRACTIONS

Walt Disney World Co., currently in a tremendous period of growth, has immediate openings in its Information Services Division for experienced professionals.

The selected candidates should have a minimum of five years experience and a Bachelor's Degree in Computer Science is preferred.

Opportunities are available for individuals with the following qualifications:

Data Base Analyst, with UNISYS Mapper Coordination, Mapper Level 34RL experience.

Data Base Analyst, with IBM DB2 and TSO/ISPF, QMF experience.

To be considered for these positions, please submit your resume with salary history (necessary to be considered), to:

Walt Disney World Co.
Professional Staffing
P.O. Box 10,090 (JBRC01)
Lake Buena Vista, FL 32830

© The Walt Disney Company

Walt Disney World Co.

An Equal Opportunity Employer

Software Engineer

Design and implement software using Microsoft Windows' Dynamic Data Exchange to transfer realtime information between data acquisition software and graphics spreadsheet systems. Port these applications to OS/2 Presentation Manager and Dynamic Data Exchange and ensure high-level compatibility in output. Design and implement graphical user interface software using Windows/386, Windows 3.0, and OS/2 Presentation Manager. Convert system-level drivers from Windows/386 to Windows 3.0. Requirements: M.S. in Computer Science; Three to four years experience in specifying, designing and developing complex software systems; Two years experience with both Windows and Presentation Manager programming; Thorough command of C programming language; Experience in 80x86 assembly language;

Full-time position
Modern technology plant; Salary: $42,000 per year

Send resumes and references to:
Oregon State Employment Division
Department of Human Resources
875 Union Street, N.E., Salem, Oregon 97311
Job Order No.: 2464809

Software Engineer required to be a Project Leader to design, develop and implement cell controller platform code and integrate code into automated manufacturing systems. Work with internal and external customers to design and implement production control systems, migrate manufacturing technology to develop control systems which enhance manufacturing, and leverage sales by transfer of control technology to customers. Will be involved with computer integrated manufacturing, automation systems, and system performance measurement and analysis. Responsible for developing a viable, standard, cost effective manufacturing software strategy and a methodology for selecting appropriate software for internal production lines. Will be involved in pre and post sales technical support. Study economic feasibility. Develop system hardware and software. Complete project status reports and documentation, including functional descriptions and technical manuals. Requirements are a Master of Science in Computer and Systems Engineering with a background in Electronic Engineering plus two years of experience in a research manufacturing environment including VAX/VMS Operating Systems. Knowledge of Robotics and Automation Systems, Systems Analysis Techniques, Computer Graphics, Estimation and Control of Dynamic Systems, Database Fundamentals, Computer Hardware, Computer System Performance Measurement and Evaluation. Salary $39,437.00 to $44,000.00. 40 hours per week. If you are interested in, and qualified for the above position, please forward your resume in duplicated to: Massachusetts Division of Employment and Training, Special Programs Department, 19 Staniford Street, Boston, Ma. 02114, Case #00666

-DATA BASE ANALYST- -PROGRAMMER ANALYST-

The Oregon State System of Higher Education, consisting of 8 campuses, is forming a centralized Data Base team in Corvallis and needs two ORACLE DB professionals.

DATA BASE ANALYST

($2464-$3286 monthly)

ORACLE experience in a multiuser mainframe environment preferred. Applications will be accepted through June 29, 1990.

PROGRAMMER ANALYST

($1957-$2602 monthly)

Oracle application tools and utilities experience preferred. For application information call Human Resources (503) 737-3103. Applications will be accepted through July 31, 1990. Oregon State University is an AA/EOE complying with Section 504 of the Rehabilitation Act of 1973.

Operations Research Analyst for firm in NE Ohio. Design and development of sophisticated computer systems and mathematical models for optimizing the efficiency of the scheduling and routing of vehicles. Position specifically includes: developing new algorithms for car loading and dispatching; writing software program to use these algorithms; and performing statistical analysis of data and management of data. Must have M.S. in Operations Research and academic program must have included one gradutate level course each in: Large Scale Problems in Mathematical Programming, Network Theory (or Graph Theory), and Integer Programming. Must be conversant (as evidenced by publications, employer testimonials, academic transcripts, and/or letters of reference from academic advisors or professors) with logistics and distribution management, design of logistical systems, reliability and replacement theory, advanced statistical methods, and data base management. Must have ability, as evidenced by either academic course work, professional experience, or publications, to design and develop software for transportation. 40 hrs/wk, 8:15 am to 5:00 pm (M-F), $32,000/year. Must have proof of legal authority to work permanently in U.S. Send resume in duplicate and course transcript (no calls) to J. Davies, JO# 1084565, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

Sunbelt Opportunities

AS/400 - S/38 Prog/Anal's..	30-37K
DB2/SQL Prog/Anal's........	30-40K
MSA or M&O Prog/Anal's..	33-40K
CICS Prog/Anal's............	30-36K
TANDEM Prog/Anal's........	30-38K
UNIVAC 1100 Prog/Anal's...	30-35K
ADABAS/NAT Prog/Anal's....	30-36K
DATACOM/IDEAL Prog/Anal's	30-35K
HP 3000-COBOL Prog/Anal's	30-35K
ORACLE-SQL Prog/Anal's...	30-39K
VAX/COBOL Prog/Anal's.....	32-36K
FOCUS Prog/Anal's..........	29-35K
IDMS-ADS/O Prog/Anal's....	29-35K
ASSEMBLER Prog/Anal's....	29-34K
EOP Auditors.....	33-43K

North Carolina's largest employment agency, in business since 1975, 300 affiliates. Opportunities in the Southeast and nationwide.

Corporate Personnel Consultants

3705-320 Latrobe Drive, Box 221739
Charlotte, NC 28222 (704) 366-1800
Attn: Rick Young, C.P.C.

CA & AZ CONTRACTS

CONSULTANTS WANTED

P. Murphy & Associates, Inc.

4405 RIVERSIDE DRIVE, SUITE 100
BURBANK, CA 91505
(818) 841-2002 (714) 552-0506
FAX: (818) 841-2122

MAINE - NH $25,000 - 50,000 Salary

ROMAC, the largest and oldest placement agency in this area, is seeking qualified data processing professionals with salary requirments in the $25,000-$50,000 range. Our clients pay our fees.

ROMAC®

Att: Dept. 2
P.O. Box 7040
Portland, ME 04112
(207) 773-4749
FAX (207) 773-2645

---

* DP PROS *

We are searching nationwide for DP candidates ready to advance their careers on a permanent or consulting basis.

TANDEM/COBOL/SNAX
CICS/COBOL/BAL
IMS DB/DC
FOCUS/SQL/DB2
DATACOM/ORACLE/IDMS
S-38/400 RPG/COBOL
UNIX/C/X.25
LAN/PC EXPERTS

Please call, fax or mail resume to:

Electronic Search - DP Division
6250 N. River Road # 7040
Rosemont, IL 60018
Phone # (708) 318-8555
Fax # (708) 318-8564

SOFTWARE OPPORTUNITIES

1-800-423-5383

Let our National Award winning computer specialists assist you in your search. We have over 300 affiliated offices around the country ready to work for you!

LIFE INSURANCE	To $60K
UNIX INTERNALS	To $60+
SYSTEM/36	To $40K+
IDMS, IMS or ADABAS	To $50K
P/A (COBOL or ALC)	To $40K
UNIX/C	To $55K
MVS or VM INTERNALS	$ OPEN
ACF/VTAM/NCP	To $50K
DB2/SQL	To $60K+
COBOL/CICS	To $40K
Software Engineers	To $60K
OVERSEAS	$ OPEN

ROBERT SHIELDS & ASSOCIATES
P.O. Box 890723, Dept. C
Houston, TX 77289-0723

FAX: 713-486-1496

University of Wisconsin-La Crosse

User Services Manager

Manage User Services group; supervise staff; schedule and teach workshops; operate Academic Computing Information Center; consult on using microcomputers and DEC VAX computers; develop documentation; coordinate software site licenses. Full-time probationary position leading to indefinite appointment. Begin ASAP after Aug. 1, 1990. Requires: bachelors in Computer Science or related, master's preferred. Experience in Academic Computing. User Services, supervision essential; In statistical software (SPSSx, SAS) desirable. Send resume, transcripts, three recommendation letters to: John Beck, Director, Academic Computing Services, University of Wisconsin-La Crosse, La Crosse, WI 54601. Review of applications begins July 23, continues until position filled. Women, minorities encouraged to apply. AA/EOE.

Western Opportunities to $80,000

Opportunities in the West and Nationwide. 200 affiliates. Our technically advanced clients need:

- **Programmer Analysts**
- **Systems Analysts**
- **Systems Programmers**
- **DBA's**
- **Software Engineers**

Experience needed in:

MVS/CICS/COBOL
Banking
RPG III
DB2
IMS
IDMS
VAX
Macintosh/68000
Graphics
Windows
Op. Sys. Internals
OS/2

Larry Wade & Assoc.
4350 Executive Dr., Suite 215
San Diego, CA 92121
619-455-9233
FAX: 619-455-9841

Immediate Contracts and full time Positions Available:

Call or Fax Resume to

DataLink Corporation
153 Waverly Place
Suite 3 - Seventh Floor
New York, N.Y. 10014

212-243-5488
Fax # 212-989-6457

"The Missing Link In D.P. Recruiting"

Systems Analyst - suburban Chicago, IL. Analyze, design, develop, implement online & batch applications in a banking environment. Provide technical support. Use IBM hardware, MVS/XA, TSO, ISPF, DB2/SGL1 MS/VS, APS, VSAM CICS, COBOL II, DIALOG MANAGER, CABS and FILEAID software. Bachelors/Math/Stats/Comp. Sci. 2yrs/exp. doing abv. or 2yrs as Analyst/Programmer doing the abv. 35hrs/wk. $30K/yr. Send resume to: Illinois Dept. of Employment Security, 401 South State St. - 3 South, Chicago, IL 60605. Att: L. Donegan. Ref #1493-D. AN EMPLOYER PAID AD.

SAN FRANCISCO

BAY AREA CONTRACTS

VAX/INGRES
VAX/COBOL
AS-400/RPG III

PCN
595 Market St., #1400
San Francisco, CA 94105

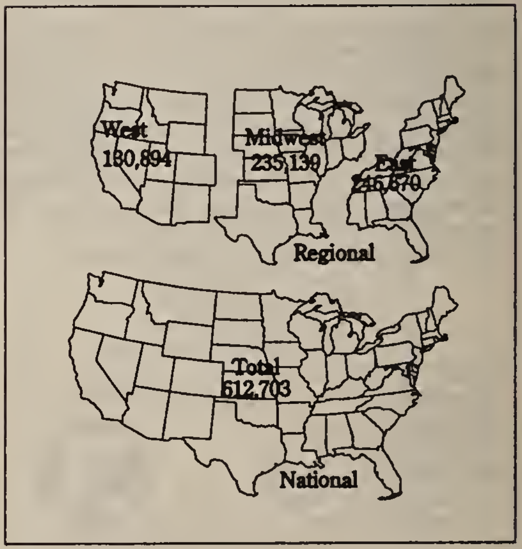
Call Lisa Cannon
(415) 777-4321

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you the unique option of REGIONAL or NATIONAL recruitment advertising.

Whether you want to run your ad in the Eastern, Midwestern, Western, National, or any combination of regional editions. Computerworld gives you the only regional recruitment advertising section available in the United States that targets only computer professionals. And no other newspaper or magazine reaches so many qualified computer professionals regionally or nationally!

Computerworld's Total Audience by Region



SOURCE: Audit Bureau of Circulations Supplemental Data Report, May 1987.

To place your ad regionally or nationally, call John Corrigan, Classified Advertising Director, at **800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD

The weekly newspaper of record for computer professionals.

AGGRESSIVE EXPANSION. IMPRESSIVE WORKFORCE.

That's Computer Task Group. If you're an innovative, quality-driven computer professional who thrives on the challenges of project diversity, CTG is where you should make your mark. Everyday, our experts turn information technology into business solutions for more than 90 of the Fortune 100. And, with over 60 locations worldwide, we *are* where you want to be.

As an international leader in consulting, systems integration and professional services, CTG's successes have made us a multi-million dollar company. But we won't stop here. As part of our aggressive expansion effort, we're staffing up our impressive workforce–3,800 strong–to meet the needs of the changing information management industry.

Right now, we're seeking more peak performers to tackle new technologies. We're looking for the best in the business with expertise in:

- DB2
- UNIX C
- AS/400
- ORACLE
- IEF, IEW
- CICS
- OS/2, C
- IMS DB/DC
- Imaging

Innovation and quality. Our customers demand it. We expect it. For immediate consideration, send your resume to:

CTG

Innovation & Quality
The I.Q. Company

Communications Department
Computer Task Group
800 Delaware Avenue
Buffalo, NY 14209
Or call 1-800-535-9600

Equal Opportunity Employer

EDUCATIONAL DEVELOPMENT AND CONSULTING

Ernst & Young, the international professional services firm, has an exciting opportunity within the firm's National office in Cleveland for an educational developer/consultant. This consultant will create and maintain courseware for new methodologies, techniques and tools within the IS practice of the firm and the firm's clients. Qualifications include:

- Two to five years work experience in course development in an information systems environment, minimum two years with multimedia instructional delivery methods and/or leading edge educational technologies
- Strong writing skills
- Ability to work with and facilitate diverse groups
- Strong consulting skills
- Innovative and creative
- Willingness to travel

An undergraduate degree is required, advanced degree desirable. Ernst & Young offers excellent salaries, competitive benefits, and an outstanding opportunity for professional development. For confidential consideration, send resume to: **Sylvia Taylor, Ernst & Young, 2000 National City Center, Cleveland, Ohio 44114.**

Ernst & Young

An Equal Opportunity Employer

Join Our Aggressive Applications Development & Operations Support Teams.

CAROLINA POWER & LIGHT COMPANY, a major force in Southeastern power generation and distribution, offers information systems professionals the kind of environment that will provide long-term professional and personal satisfaction—the latest in proven technology and an appealing lifestyle. We're looking for data processing professionals to join our team and provide aggressive applications development and operations support.

Along with wide use of personal computers, we're operating one IBM 3090-300, one IBM 3090-200, and one Amdahl 5890-300. The CICS on-line environment has been growing at the rate of 40% per year. Recently, we have expanded to a new Data Center. We're operating under MVS/XA and VM/CMS utilizing an SNA/SDLC network consisting of over 3,000 terminals and printers. Our programming languages are COBOL, SQL and DATACOM's IDEAL. We have adopted DB2 as our standard for new application development and are aggressively expanding our use of PC-based and mainframe-based CASE tools.

We have recently completed a large strategic planning study and have a significant backlog of technical and application development projects. We are currently seeking the following:

APPLICATIONS DEVELOPMENT

Programmers

Positions require 4 + years of structured coding experience. Highly desired experience would include COBOL, CICS, DB2 and DATACOM. A four-year degree is preferred.

Systems Analysts

Positions require 4 + years experience in a development environment versus a maintenance environment. Highly desired experience would include structured design techniques, data modeling experience, prototyping and Method/1 knowledge. A four-year degree is preferred.

DATABASE ANALYST

Position requires 4 + years experience utilizing a relational database engine, preferably DATACOM/DB. Desirable experience includes formal participation in the physical DB design activity of development projects. A four-year degree is preferred.

LAN SUPPORT ANALYST

Requires 3-5 years of technical experience in personal computer support, including a minimum of 1-2 years in the design, implementation and support of Local Area Networks, SR.ably in a LAN-to-LAN or wide area connectivity environment. Banyan network operating system experience strongly desired. Candidates must possess strong verbal and written communication and client consulting skills. A four-year degree is preferred.

CP&L offers competitive salaries, excellent benefits, and opportunities to advance. If you're interested in becoming part of our important team of professionals, send resume with salary requirements to: **Randy Millwood, Senior Recruitment Representative, Dept. CW6180, CAROLINA POWER & LIGHT COMPANY, P.O. Box 1551, Raleigh, NC 27602.** An Equal Opportunity/Affirmative Action Employer.

CP&L

Carolina Power & Light Company
Energy In Operation

Software Engineer II - Responsible for mass storage performance and architecture. Integration testing of storage products to verify compliance with storage and communication architecture specifications. Work with the design/development groups to understand and influence the hardware design principles and communication protocols used in new products to optimize performance. Develop and test software required for architecture verification and compliance testing of storage architectures and communication protocols. Tune these tools for performance, and develop project plans and product documentation. Design, code, test analyze and support new performance characterization tools for complex storage subsystems, which are networked communicating systems. Tools will be written in C programming language, running under the UNIX operating system, and additional support requires PASCAL and FORTRAN. Utilize these tools to analyze I/O subsystems. Identify performance bottlenecks, and work to remove them. Perform detailed mathematical analysis on performance data collected using these tools. Use performance modeling techniques to build and analyze models for I/O subsystems. Requirements for this position are: A Master of Science degree in Computer Science; knowledge of design, analysis and performance aspects of networked communicating systems; knowledge of the UNIX operating system and performance modeling techniques; background in C, PASCAL and FORTRAN; knowledge of hardware design principles and communication protocols, analytical and math skills. Salary $37,419.20 to $40,419.20 per year. No exp. req. (40hr/wk. 8:15am-5pm). If you are interested in, and qualified for the above position, please forward two (2) copies of your resume to: J.O. #00662, Commonwealth of Massachusetts, Dept. of Employment & Training, Special Programs, first floor, 19 Staniford St., Boston, MA 02114

COMPUTER PROFESSIONALS

COAST TO COAST

IS CLOSER THAN YOU THINK

F-o-r-t-u-n-e Personnel Consultants is one of the largest national networks of independently owned and operated offices specializing in the placement of Computer Professionals at all levels from professional staff to top management. We understand your needs and can help you find the position to enhance your career or the people to fill your company openings.

Coast-to-coast we're closer than you think. To reach our network of specialists serving your area of interest, send your resumé or call us for immediate, confidential consideration.

655 Third Ave., Dept. CW, NY, NY 10017

Call:

1-800-221-4864

or 212-697-4314
In NY State

F-o-r-t-u-n-e®
Personnel Consultants

Computer Professionals Expect NCA To Increase Their Earnings And Benefits . . . and that's what we do Better than anyone else!

Earnings and benefits are probably not your only reasons for working... but they're certainly high on everyone's priority list.

By using the services of an NCA firm you are automatically assured of superior professional representation... consultants who are vastly experienced and knowledgeable in the art of negotiation.

Employers, having worked with us for many years, are pleasantly responsive to our recommendations because we have a long established reputation with them for our honest and fair negotiations.

So, if you suspect that your earnings and benefits are less than they should be... Come in. Call. Or mail your resume to the NCA firm nearest to you. No charge to you ever for any of our excellent services.

National
Computer
Associates

ATLANTA: DataPro Personnel Consultants
1050 Crown Pointe Pkwy Suite 430
Atlanta, GA 30338 (404) 392-9990
BOSTON: Robert Kleven & Co., Inc
PO Box 636
Lexington, MA 02173 (617) 861-1020
CHICAGO: Thomas Hirtz & Associates
150 North Wacker Drive, Suite 1700
Chicago, IL 60606 (312) 977-1555
CINCINNATI: Task Group
7875 Reading Road
Cincinnati, OH 45237 (513) 821-8275
CLEVELAND: Innovative Resources, Inc
Statler Office Tower, Suite 426
1127 Euclid Avenue
Cleveland OH 44115 (216) 621-4220
COLUMBUS: Michael Thomas, Inc
450 W Wilson Bridge Road Suite 340
Worthington, OH 43085 (614) 846-0926
DALLAS: DataPro Personnel Consultants, Inc
13355 Noel Road, Suite 2001
Dallas TX 75240 (214) 661-8600
DENVER: Abacus Consultants, Inc
1777 South Harrison Street, Suite 404
Denver, CO 80210 (303) 759-5064
DETROIT: Electronic Systems Personnel
3000 Town Center, Suite 2580
Southfield MI 48075 (313) 353-5580
GREENSBORO: DataMasters
PO Box 14548
Greensboro, NC 27415-4548
(919) 373-1461
HARTFORD: Compass, Inc
875 Asylum Avenue
Hartford, CT 06105 (203) 549-4240
HOUSTON: Career Consultants, Inc
1980 Post Oak Boulevard, Suite 1050
Houston, TX 77056 (713) 626-4100
KANSAS CITY: DP Career Associates
6405 Metcalf, Suite 502
Shawnee Mission, KS 66202 (913) 236-8288
LOS ANGELES: Superior Resources, Inc
22653 Pacific Coast Highway, Suite 1-106
Malibu, CA 90265 (818) 884-3000
MIAMI: Data Sciences Personnel, Inc
PO Box 8577
Hollywood FL 33084 (305) 434-6112
MILWAUKEE: EOP Consultants, Inc
Chancellory Park II, Suite 350
350 N Sunnyslope Road
Brookfield, WI 53005 (414) 797-8855
MNPLS./ST. PAUL: Electronic Systems Personnel
880 International Centre
900 2nd Avenue South
Minneapolis MN 55402 (612) 338-6714
NEW JERSEY: Systems Search
2040 Millburn Avenue
Maplewood, NJ 07040 (201) 761-4400
NEW YORK: Botal Associates, Inc
7 Dey Street, Suite 410
New York, NY 10007 (212) 227-7370
PHILADELPHIA: Systems Personnel, Inc
115 West State Street
Media, PA 19063 (215) 565-8880
PHOENIX: Professional Career Consultants
4725 North Scottsdale Road, Suite 209
Scottsdale, AZ 85251 (602) 274-6666
PITTSBURG: KCS Computer Services, Inc
400 Penn Center Blvd Suite 320
Monroeville, PA 15235 (412) 823-8632
ROCHESTER: Traynor Confidential Ltd
10 Gibbs Street, Suite 400
Rochester, NY 14604 (716) 325-6610
SAN DIEGO: Technical Directions Inc
8880 Rio San Diego Dr. Suite 1025
San Diego, CA 92108 (619) 297-5611
SAN FRANCISCO: Professionals for Computing, Inc
455 Market Street, Suite 1850
San Francisco, CA 94111 (415) 957-1400
SEATTLE: Houser, Martin, Morris & Associates
110 110th Avenue N.E., C-90015
Bellevue, WA 98009 (206) 453-2700
STAMFORD: Hipp Waters Professional Recruiting
707 Summer Street
Stamford, CT 06901 (203) 357-8400
ST. LOUIS: Executive Career Consultants
795 Office Parkway, Suite 100-CW
St Louis, MO 63141 (314) 994-3737
SYRACUSE: The CFA Group Inc
5790 Widewaters Parkway
Dewitt, NY 13214 (315) 446-8492
AUSTRALIA: For information, contact the NCA firm nearest to you

---

CONTRACT PROGRAMMERS

WITH A MINIMUM OF 4 YRS EXP.

DB ADMINISTRATOR
Up to $45 per hour

ADABAS/NATURAL 2.0
SENIOR PROGRAMMER/ANALYST
Up to $40 per hour

IDMS/ADS/O	IMS/DB/DC
CICS/OS/DOS	AS400, S38, MICS
PRIME 9000	UNISYS, UNIX
DEC, MICROVAX	DB2, SQL
VMS, DECNET	ETHERNET
INGRES/ORACLE	UNIVAC 1100, TIP
FOCUS	ADA
P/C SPECIALIST	MODEL 204

Openings in CA, TX, LA, MO, OK, IL, OH, MI, NC, VA, and West VA.

J.P.S. INC
P.O. Box 690007
Houston, TX 77269-0007
(713) 820-0024
Toll Free (800) 633-0391
FAX (713) 370-8021

No trainees or part-time positions
Equal Opportunity Employer

IBM INSTRUCTORS

Short-term (2 weeks to 1 month) assignments in

SAUDI ARABIA

All expenses paid. Lucrative compensation. Requirements include teaching experience in any and all levels of MVS/ESA short courses.

THE LESLIE CORPORATION
400 E. Sam Houston Parkway N.
Suite 701C
Houston, TX 77060-3534

(713) 591-0915
FAX (713) 591-0921

Contract Consulting International Assignment

Airlines - Image Processing, LAN/WAN networking, ACP/TPF, PARS-IPARS, DB2-Internals/DBA/Applications Development

Senior Systems Analyst Contract/Florida

- Superior verbal & written communications
- Audience presentation
- Teaching/Education to clients
- BACHMAN design products for logical & physical databases
- Relational databases - IBM DB2
- CICS
- COBOL II

Programmers/Programmer Analyst/Systems Analyst Contract/New Jersey

- SYBASE
- ORACLE
- ARTIFICIAL INTELLIGENCE
- TECH/WRITERS - Communications/Publication experience with UNIX VAX & ATT product line

Contracts/Deep South

- Past Bell Billing Experience
- User Presentation HP-XWINDOWS & Motifs
- IEF CASE TOOLS
- IEF Methodologies CASE TOOLS
- Design, Develop & Implementation Distributed Systems Management - Distributed Structured Platform

Contract/New Jersey

- Systems Designer ORACLE/Artificial Intelligence
- Programmer ORACLE C++
- Programmer SQL Forms

Systems Analysts Contract Alaska

- IMS DB/DC DB2 & COBOL Applications/Revenue, Payroll, Accounting, Materials Management

Send resume/call

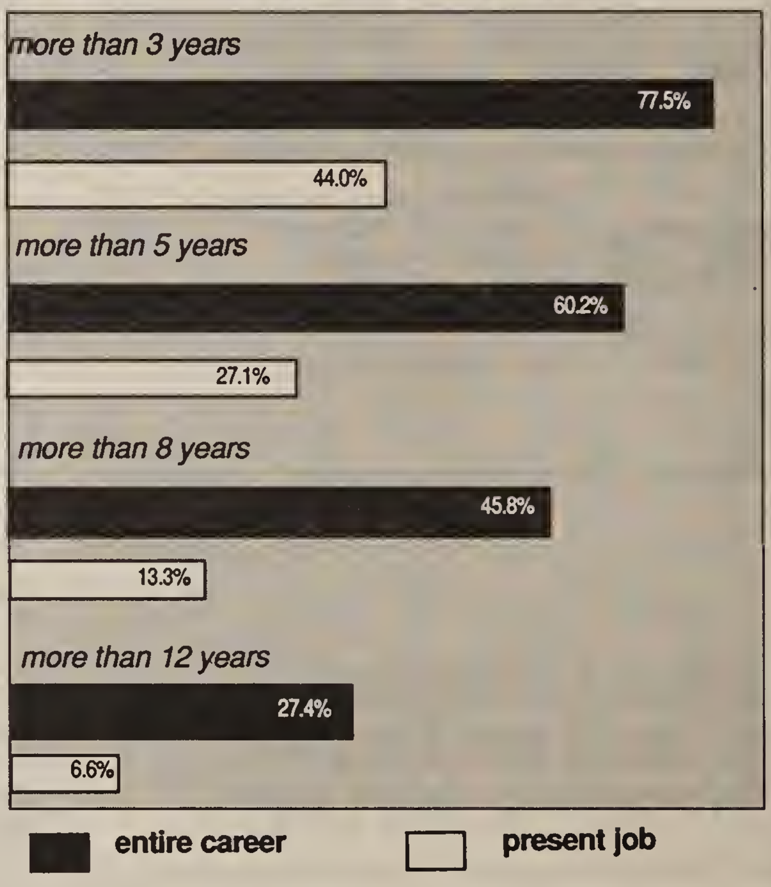
Robert H Broselofsky-Pres/CEO
RHB Associates
473 FDR Drive - K1305
New York, NY 10002
212-982-2887

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you only qualified computer professionals.

Unlike the readers of Sunday or daily newspapers, every Computerworld reader is an experienced computer professional. In fact, the majority of Computerworld's audience has experience beyond three years. What's more, some subscribers have been reading Computerworld ever since its first issue in 1967. Simply put, Computerworld delivers far more than just job candidates - it delivers qualified job candidates.

Years in current Job Function
Reported By Computerworld's Audience of 612,703



To place your ad regionally or nationally, call John Corrigan, Classified Advertising Director, at **800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD
The weekly newspaper of record for computer professionals.

PROGRAMMER ANALYSTS

Established consulting firm offering excellent salary and benefits package. Outstanding opportunities for programmer/analysts with VAX, TANDEM and IBM hardware experience in any of the following areas:

- COBOL
- NATURAL
- SQL
- ADABAS
- POWERHOUSE
- FORTRAN
- CICS
- ORACLE
- DB-2
- FOCUS
- SCOBOL
- FMS
- RDB
- IMS
- RAMIS

For more information contact:

Pittsburgh Business Consultants, Inc.
411 7th Avenue, Suite 1401A
Pittsburgh, PA 15219
(412) 391-0714
FAX (412) 391-0478
Equal Opportunity Employer

★ LEARN CASE TOOLS ★

DB2 • CICS • IMS DB/DC • IDMS/ADSO

International leader in Hardware/Software Vendor Industry currently seeking CICS & DB2 P/A's to learn CASE TECHNOLOGY!

- Highly Competitive Starting Salary!
- Generous Expense Account!
- Work only on new IBM products!
- Positions in So. Cal., USA & overseas!

ALSO NEW DATA CENTER!

CICS/DL1 • IMS DB/DC • M&D/MSA
DB2 • IDMS/ADSO • VTAM • MVS/ESA

PROGRAMMER/ANALYSTS:
ALL NEW DEVELOPMENT IN SO. CALIF.
SYSTEMS/PROGRAMMERS:
PERFORMANCE & TUNING. INSTALLATIONS & CONVERSIONS. INTERNALS KNOWLEDGE A PLUS!

Call RICK BEAMS Today!
213-276-6339 FAX: 213-858-1599
9100 WILSHIRE BLVD., SUITE 442 BEVERLY HILLS, CA 90212

Data Processing

Seltmann, Cobb & Bryant, Inc., a data processing consulting company providing software development services to utilities, government and private industry has openings throughout your region for DP professionals with the following experience:

- **IMS DB or DC**
- **DL1**
- **DB2**
- **ADF**
- **S/36, COBOL**
- **AS/400**
- **MSA PKGS.**
- **WANG VS**
- **DBA-DB2**
- **CICS/DL1**
- **RPG III**
- **CICS/IDMS**
- **IDMS ADS/O**

If you have above average skills and are seeking an alternative, call SCB. 1-800-221-9525 or 615-256-5122. FAX (615-244-4947) or mail resume to our Regional Staffing Office:

Seltmann, Cobb & Bryant, Inc.
227 2nd Ave. North, 3rd Floor
Nashville, TN 37201

ATLANTA Southeast
(404) 447-8773
TO $95,000

TOP RATES NOW IN 7 STATES
Contract or Permanent Employment

COBOL • VSAM • CICS • DATACOM • DB2
IDMS/ADSO • AS400 RPG III • 36 RPG II
DEC • DIBOL • COBOL • UNIX • C • FOCUS

Come Grow with Us! Fast Paced Opportunities.

BRANNON & TULLY

Programmers
Analysts
Project Mgrs
Sales/Mkting

BRANNON & TULLY, INC.

8201 Fairview Rd, Ste 200
Charlotte, NC 28210
704-552-6855

3189 Holcomb Br. Rd, Ste 875
Norcross, GA 30071
404-447-8773

TO LEARN!
TO SERVE!
TO SUCCEED!

Are these the things you want? Read on!

Since 1976 we have been a leading consulting firm in the development of mainframe applications using state-of-the-art technology. Our **CALIFORNIA REGION** currently has a need for professionals with a min. of three years experience and one or more of the following skills:

- DB2/CSP
- DB2/SQL/QMF
- M204
- COBOL/VSAM/CICS
- PAYROLL/IDMS/ADSO
- TESSERACT BPA
- COBOL/VSAM/MVS/JCL

Benefits include tuition reimbursement & profit sharing, competitive compensation & a variety of project assignments. Send resume to:

DATRONICS
14241 Firestone Blvd. Suite 220
La Mirada, CA 90638
Call: **213/802-3262**

HP System Manager Washington State

Recruitment #R90-32

The City of Vancouver and Clark County, Washington, is seeking experienced data processing professionals for an HP System Manager opening. This is a technical position, responsible for HP MPE/XL, HP MPEV, and HP HPUX systems support work.

College degree in computer science or related field desired, plus four years of system programming experience, with at least two years experience as a system manager utilizing the above-referenced systems. Experience may be substituted for formal education.

Application packets **MUST** be obtained, completed, and submitted with resume to the City of Vancouver Citizens Service Center, PO Box 1995, Vancouver, WA 98668-1995, and **RECEIVED NO LATER THAN 4:30 p.m., Friday, June 29, 1990.**

Equal Opportunity/Affirmative Action Employer

COMPAQ

Why quality has always called Compaq home.

There's a reason why Compaq products enjoy some of the industry's highest user satisfaction ratings. It's the same reason Compaq has attained levels of success unparalleled in the history of business. And it's why our achievements in performance and compatibility are now the standard for the industry.

It's simply because, at Compaq, quality is designed in, not added on. And a key force behind this philosophy is our outstanding Software Quality Assurance team.

Talented individuals, Compaq Software Quality Engineers are at the very center of every new product development – from start to finish. Working side-by-side with development teams, they design advanced systems software, develop comprehensive verification procedures and solve problems as they occur, ensuring every Compaq product meets the reliability standards we've set for ourselves and for the industry.

They design our products for the highest quality right from the beginning – then see that the quality is maintained every step of the way. That's why we're able to design, develop and introduce innovative new products faster than anyone else. And why quality has always called Compaq home.

Software Quality Engineers

Our continued success has created immediate opportunities for Software Quality Engineers on the Compaq team.

As a Compaq Software Quality Engineer, you'll be involved in the design, development and verification of advanced new Compaq products at the forefront of PC technology. You'll perform a key role in software development projects such as operating systems, device drivers and utilities for PC systems. Above all, you'll help provide bottom-line answers to functionality in PC innovation.

You'll verify functionality and compatibility within industry standard operating environments such as MS-DOS, OS/2, Presentation Manager and Windows. In addition, you'll analyze and develop test strategies for Compaq-specific utilities which perform memory management, installation, and disk caching.

To qualify, you should have a BSCE, BSCS, BSEE or equivalent, and related software development experience. A knowledge of PC architecture, 'C' and Intel Assembler programming skills is a plus. Moreover, you should be a disciplined team player with a logical approach to problem solving, strong attention to detail and a commitment to quality.

Make a quality career move.

At Compaq, you'll find an environment where you're free to put your greatest abilities to the test – pushing the limits of technology, and finding practical solutions to the needs of today's PC user. Compaq offers competitive salaries, comprehensive benefits and unequaled work environment.

So if you're interested in these opportunities with the Compaq team, simply submit your resume to:

Compaq Computer Corporation, Dept. CW618-YA, P.O. Box 692000, Houston, Texas 77269-2000.

Compaq is an affirmative action employer, m/f/h/v.

COMPAQ

HOUSTON

Computer Power Group
the difference is Quality

COMPUTER POWER GROUP provides a broad range of computer consulting services to companies. With 80 offices on four continents, we have built a solid reputation for technical excellence and quality performance. CPG is committed to our employees. We offer superior assignments, growth and learning opportunities. CPG is seeking experienced programmer analysts; find a career with us!

120 Montgomery St. #1560
San Francisco, CA 94104
Call Christopher Olsen
(415) 391-0365
Fax: (415) 391-2055

5110 North 40th St.
Phoenix, AZ 85018
Call: Given or Star
(800) 926-7635
Fax: (602) 956-8254

PROGRAMMERS
Contract Assignments
$24-28/Hr.
+ Per Diem.

The best in the Sunbelt

Jr to Sr level programmers with 1+ yrs exp in IBM, "C" PL-1, ASSEMBLER & other high-level languages. Contract assignments 12-18 mos + $24-28/Hr + per diem +

Contact: Al Madsen, C.E.C.
CORPORATE PERSONNEL CONSULTANTS, INC.
3705 Latrobe Drive, Suite 310
Charlotte, NC 28211
(704) 366-1800
FAX (704) 366-0070

SAN FRANCISCO BAY AREA

Our client base is expanding. We are seeking candidates with the following skills:

• DB2	Application Development Data Base Design
• IDEAL	Applications Development
• HOGAN	Systems Software Development

THE SEARCH FIRM, INC.
595 MARKET STREET, SUITE 1400, SAN FRANCISCO, CA 94105
(415) 777-3900 FAX 777-8632

MARKETPLACE

Leading without bleeding

Equipment arbitrage can let you upgrade technology without red ink

BY THOMAS D. OLESON
SPECIAL TO CW

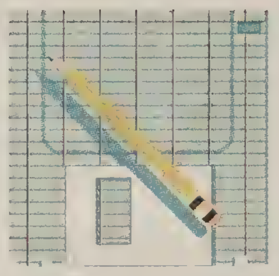
I've got to say this quietly. If everyone knows about it, and everyone tries it at the same time, it won't work. I'm talking about . . . shhh . . . equipment arbitrage.

What is it?

Arbitrage means buying in a weak market and selling in a strong market. In the case of computer equipment, this means buying at deep discounts early in a product's life, then selling before prices in the used equipment market drop with the introduction of replacement technology. The result is a leading-edge technology strategy that minimizes the financial bleeding.

Let's review the basic rules of buying at a deep discount. You don't all work for Humongous Enterprises, Inc., so you may not be able to buy 1,000 personal computers at a crack for a 40% discount. But you probably don't have to buy just one at a time with no discount. If a year's worth of buying is 200 machines, and you purchase them together, you may get a 33% discount. You may even be able to buy PCs to cover needs for three years, put them on an operating lease that comes to less than 90% of the equipment's value and spread the payments over three years.

The idea is to maximize the discount by any means: a volume purchase agreement, a dollar volume discount or a package deal involving other equipment.



There are a number of critical prerequisites to the deal. One is a philosophy supporting the use of leading-edge platforms. Another is gaining or maintaining control over the distributed technology that users own and depreciate on their budgets. These PCs, terminals, printers, modems and control units are among the best types of equipment for arbitrage, but if users control them, you won't be able to convince them to sell the equipment in time to pull off the arbitrage.

Depreciation is the next consideration. To make a decent profit, vendors have to churn out new technology rapidly. Most of us were trained to depreciate equipment over five years, which allows the hardware giants to create book losses for us. They'll release new technology at a clip that pushes market values significantly below book values. Why not reduce your depreciation period to four years for most equipment so you won't be hit with these book losses?

Whether purchased or leased, the timing of your move to the new technology is critical. Once new technology begins to replace current equipment, used devices on the secondary market will drive down the value of your assets. You must move quickly.

How quickly? It depends on the vendor's production schedule and marketing strategy, but three to four months may be too long to wait. To avoid delays, get acquisitions pre-approved, based on agreed-on assumptions. Research upcoming product announcements with staff members, technology think tanks and the vendor. Determine what the new product will do and when it is likely to arrive.

Here's a concrete example: A printer sold in late 1988 for $4,400. Through a volume purchase, you might have gotten a 27% discount, yielding a cost of just over $3,200. The used market price was still $3,300 in November 1989 but fell to $2,100 by May 1990. Had you purchased the machines as late as the fall of 1988, you could have used them free for a year and replaced them with laser jet technology. But had you kept them for 18 months, they would have cost you $1,100 each, ignoring depreciation.

Once you buy, what do you do with all of the old equipment? You might find a third-party remarketer who has a better opinion of it than you do, but therein lies the problem. Remarketers should have pretty much the same sense of its worth as you do.

Know thy lessor

The rule is, "Know thy lessor or broker." First, deal only with the ones you know personally, have worked with in the past and trust. Then assume you will give them a fair profit, even if it means settling for less than everything you'd like to get. And don't tell the world you have a lot of equipment to dump; if word gets around, it will drive your price down.

If you wish to collect top dollar from each sale yourself, offer the broker a flat remarketing fee for each machine sold, hold the unsold equipment and collect the proceeds from sales. Because you continue to own the equipment, you, not the broker, bear the full risk and thus deserve the lion's share of any profit. By doing this, you can minimize the remarketing fee. This approach poses no risk to the broker but also offers little incentive to sell the machines, let alone to get the best price. You may end up with a bunch of unsold equipment after the market has softened.

A modification of this approach can bring you a higher total return and lessen the risk that equipment will go unsold. Agree up front to a partial payment from the broker for all the equipment and a percentage split of the rest of the proceeds that gives the broker more profit than usual. This kind of deal provides the broker with a greater incentive to get rid of the equipment before the market drops. If this goal is achieved, the result should be a win-win situation.

That's equipment arbitrage: For the right type of equipment, it's the ultimate in leading-edge technology strategies.

Oleson is financial director of information processing at John Hancock Financial Services in Boston.

Index

Marketplace 122
Buy/Sell/Lease 122
Bids Proposals/Real Estate . . 124
Peripherals/Supplies 124
Conversions 125
Time/Services 125
Graphics/Desktop Pub 126
Software 126
Business Opportunities 126
Training 127

Buy/Sell/Lease

COMPUTER ROOM EQUIPMENT

LIEBERT
Computer Room Air Conditioners
3 thru 22 Ton Units
Main Frame Chillers
3 thru 12 Ton Units
Power Distribution Units
30 thru 225 KVA

PILLER
40 & 75 KVA Silentblocks

LIEBERT, EXIDE, EMERSON EPE & IPM
18.75 - 556 KVA UPS Systems

RAISED ACCESS FLOORING
Thousands of square feet in stock, wood and steel.

All items listed are reconditioned with warranty

DP SUPPORT
P.O. Box 1409
Plano, TX 75086
214-422-4551
214/578-1238 Fax

Computerworld's
Classified Marketplace
needs only 6 days notice to run your ad!
Call:
(800) 343/6474
(in MA: 508/879-0700)

IBM SPECIALISTS

SELL ● LEASE ● BUY
S/34 S/36 S/38 AS/400
3741 3742

- New and Used
- All Peripherals
- Upgrades and Features
- IBM Maintenance Guaranteed
- Immediate Delivery
- Completely Refurbished

800-251-2670
IN TENNESSEE (615) 847-4031

CMA
COMPUTER MARKETING
of America, Inc.

PO BOX 71 ● 610 BRYAN ST. ● OLD HICKORY, TN 37138

HONEYWELL

NEW/USED EQUIPMENT
- All Models
- Ultimate Equipment
- Older Equipment Available
- Buy-Sell-Lease-Trade

PARTS & REPAIR
FULLY GUARANTEED
PROMPT DELIVERY

Call: Level 6 Systems
1-216-951-2221

BULL

STK - R22
20 GBYTE
$50,000
Tom
913-491-3663

The BoCoEx index on used computers

Closing prices report for the week ending June 1, 1990

	Closing price	Recent high	Recent low
IBM PC Model 176	$375	$660	$250
XT Model 086	$500	$700	$350
XT Model 089	$650	$825	$475
AT Model 099	$1,000	$1,375	$850
AT Model 239	$1,100	$1,325	$700
AT Model 339	$1,200	$1,400	$900
PS/2 Model 50	$1,300	$1,700	$1,050
PS/2 Model 60	$2,060	$2,200	$2,000
Compaq Portable II	$1,475	$1,725	$1,400
Portable III	$2,275	$2,500	$1,900
Portable 286	$1,700	$2,000	$1,500
Plus	$650	$750	$650
Deskpro	$825	$900	$800
Deskpro 286	$1,400	$1,625	$1,300
Deskpro 386/16	$2,500	$2,750	$2,475
Apple Macintosh 512	$500	$775	$450
512E	$450	$450	$350
Plus	$1,150	$1,275	$1,000
II	$3,300	$3,500	$3,050

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Buy/Sell/Lease

CANADA SITES

IBM 43XX & 30XX
(1200 sites)
IBM 3X/400
(2800 sites)
VAX
(2100 sites)
VARS
(650 sites)
☛ Discs – d-base or ASCII
☛ MIS Yearbooks for 1990

Who's Who Database
(416) 271-1601
FAX 271-4522

B.F. Associates inc

- Data General
- Fujitsu
- Data Products
- CDC
- Printronix
- Zetaco

BUY SELL TRADE

617/982-9664
FAX:
617/871-4456

It's the

Classified Marketplace

Reach Computer Professionals Where They Shop For:

☐ Buy/Sell/Lease
☐ Hardware
☐ Software
☐ Peripherals/Supplies
☐ Communications
☐ Graphics/Desktop Publishing
☐ Time/Services
☐ Bids/Proposals/Real Estate
☐ Business Opportunity

CALL NOW

800-343-6474
(in MA., 508/879-0700)

BUY • SELL • LEASE

AS/400
S/38, 36, 34
SERIES 1

- *SYSTEMS*
- *PERIPHERALS*
- *UPGRADES*

SOURCE DATA PRODUCTS

19762 MacArthur Blvd.
•120, Irvine, CA 92715

(714) 851-1970
(800) 333-2669

IBM **BUY · SELL · LEASE**

Member
Computer Dealers
& Lessors Association
CDLA

9370
4381

SYSTEM 36/38

AS/400

POINT OF SALE

SERIES 1

- Processors
- Peripherals
- Upgrades

DEMPSEY & ASSOCIATES INC

18377 Beach Blvd., Suite 323
Huntington Beach, CA 92648 (714) 847-8486

(800) 888-2000

1-800-678-9-IBM®

The only number you need to know when buying, selling or leasing IBM® equipment.

IBM IS A REGISTERED TRADEMARK OF INTERNATIONAL BUSINESS MACHINES INC

NEWPORT LEASING, INC. • 2943 Pullman St. • Santa Ana, CA 92705-5818
OFFICE: 714/478-8476 FAX:714/476-9200

HONEYWELL EQUIPMENT

L66 DPS 440 3 MEGABYTE SYSTEM
Datanet 355 & Datanet 8
451/501 Disks PRU1200
610 Tape Subsystem
Other Associated Equipment

DPS 6/40 1 MEGABYTE SYSTEM
40 MB Disk 600 LPM
(1) 7305 (3) 7823

MICROSYSTEMS 6/10 WITH 35CPS LQP

IF INTERESTED IN BIDDING CONTACT
Richard S. Morgan, Info. Systems
Singing River Hospital
(601) 938-5378

AS/400 S3X
RS/6000
SERIES/1
937X RT 4300

Currently replacing Series/1's with the new RS/6000 line via EDX to AIX migration

612·942·9830

DATATREND Inc.
10250 Valley View Road, Suite 149
Eden Prairie, Minnesota 55344

---

buy.sell trade

DEC
IBM
COMPATIBLE

- SYSTEMS
- PERIPHERALS
- NOVELL AUTHORIZED

• CPUs • MEMORIES • DISC & TAPE DRIVES • CRTs • TERMINALS • PRINTERS • INTERFACES Etc.

dce DIGITAL COMPUTER EXCHANGE INC
2487 Industrial Pkwy. West, Hayward, CA 94545

dda Digital Dealers Associates
Call (415) 887-3100
Fax (415) 887-5590

* Registered trademark of Digital Equipment Corporation

NEW WANG PC*s
at Significant Savings

- Custom configurations for LANetworking
- Professional Service, Fast Delivery
- Also IBM, Epson, NBI, HP, NEC and Arche PCs.

ALSO WANG REMANUFACTURED
PRINTERS • VS • PERIPHERALS
SAVE UP TO 50%

- Remanufactured equipment qualifies for free WANG installation and is guaranteed for the WANG Service Contract
- Large Inventory, Fast Delivery

wpb
An Office Automation Company
1-800-223-9264
AUTHORIZED WANG PC*
AND REMANUFACTURED DEALER
*EASTERN ZONE AND SOUTHERN CALIFORNIA ONLY

VAX RENTALS

MV 3600
MV 3800/3900
VAX 6000 SERIES
VAX 8000 SERIES
Systems & Peripherals

• Fast Turnaround • Dependable Products
• Upgrade/Add-On Flexibility

• 6 Months • 12 Months • 24 Months

BROOKVALE ASSOCIATES

CDLA Member Computer Dealers & Lessors Associates
dda Digital Dealers Associates

EAST COAST
(516) 273-7777

WEST COAST
(206) 392-9878

Your used computer equipment deserves a second chance.

If you have used computer equipment to sell, *Computerworld's* Classified Marketplace is the best place to do your selling. That's because the Classified Marketplace features a Buy/Sell/Lease section to help you market your equipment to the very people who are looking to buy.

And when you advertise in *Computerworld* Classified Marketplace, you reach a total (ABC-audited) audience of over 612,000 computer professionals who turn to *Computerworld* for news, information, features -and the Classified Marketplace - every week.

So give your used computer equipment a second chance today.

To reserve your space, call:

800/343-6474
(in MA, 508/879-0700)

WE BUY DEC

(916) 638-5606

Buying
Selling

DEC - SUN
Data General
Plus
All Peripherals

Call DCC

617-837-7255
or
301-750-7200

AS/400 Specialist

Buy • Sell • Lease

Large Discounts
Full IR Support

S/36 • Upgrades
• Tradeins

800/451-3407

CA: 213-372-8098
Fax: 213-372-7493

Strand Computer Resale
1800 The Strand
Hermosa Beach, CA 90254

Reconditioned
digital IBM
Equipment

Whatever your requirements are for Digital & IBM Equipment, call CSI *first!* Buying, selling, trading, leasing, consignments - we do it all!

CSI sells all equipment with a 30 day unconditional guarantee on parts and labor and is ***eligible for DEC or IBM maintenance.***

Offering systems, disk drives, tape drives, printers, terminals, memory, options, boards, upgrades and many more.

CSI Compurex Systems, Inc.
83 Eastman St,
Easton, MA 02334
Call Toll-Free
1-800-428-5499
In Mass. (508) 230-3700
FAX (508) 238-8250

HEWLETT PACKARD

1000 • 3000
9000

Computers
Peripherals
Terminals

Buy • Sell
Rent • Lease

EURODATA INC.
2574 Sheffield Road
Ottawa, Canada K1B 3V7
613-745-0921
FAX: 613-745-1172

Buy/Sell/Lease

IBM 3191 & 3192 DISPLAY STATIONS

FOR SALE OR LEASE

WITH WARRANTY REMAINING - REFURBED AND PACKED

CONTACT MARSHALL CROMWELL (703) 264-2419
FAX (703) 476-5767

PACIFICORP
Capital, Inc.

PRIME

EXPERIENCED SYSTEMS AND PERIPHERALS

BUY-SELL-LEASE
BROKERAGE

NEW PLUG-COMPATIBLE
DISK, TAPE, MEMORY

PLUS
THE FASTEST I/O
AVAILABLE ANYWHERE

1ST SOLUTIONS, INC.
11460 N CAVE CREEK RD
PHOENIX, AZ 85020

ASK FOR DON SHIFRIS

602-997-0997
Fax: 602-997-1688

CDLA Member Computer Dealers & Lessors Association

CALL US LAST

GET YOUR BEST PRICE
THEN CALL
COMPUTER BROKERS, INC.
WE
Buy - Sell - Lease
New and Used IBM Equipment
AS400 - System 36, 38, 43XX

SHORT TERM RENTALS

Call 800-238-6405
IN TN 901-372-2622

ascd MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

COMPUTER BROKERS, INC.
2978 Shelby St., Memphis, TN 38134

'Since 1974'

HP HP HP HP

1000 • 3000 • 9000
Including Spectrum

Processors • Peripherals • Systems

All in Stock - Immediate Delivery
All warranted to qualify for manufacturer's maintenance

BUY • SELL • TRADE • RENT • LEASE

ConAm Corporation
It's Performance That Counts!
800/643-4954 213/829-2277

ICE LTD. INTERNATIONAL COMPUTER EXCHANGE LTD.
1-800-ICE-BUYS

digital
Data General
SUN
apollo
IBM
PC/AT/PS2

BUY • SELL • LEASE • NEW • USED
PERIPHERALS • SYSTEMS • UPGRADES

RECONDITIONED COMPUTER EQUIPMENT

KDJ11-BF..11/84 CPU
MSV11-JE..2MB.11/84

IBM 2MB..upgrade
$400.+

KA630-AA..MVII..CPU
MS630-CA..8MB..MVII

Compaq.1MB.113633
Deskpro.......286

MICRO VAX 3500/3600
VAX..........6200/6300

Intel....82380-20
Intel....80486-25

- Call today for quote -
1-800-ICE-BUYS

INTERNATIONAL COMPUTER EXCHANGE, LTD.
TEL.: (617) 585-8888 • FAX: (617) 585-9177
• 163 MAIN ST. • KINGSTON, MA 02364 •

Buy Sell
Lease

☑DV-31BT1-AA (NEW)	$10,065.
☑VAX 8530	CALL
☑VS464-EA	$5,095.
☑TK50/TQK50	$1,875.
☑KA650-AA	$5,700.
☑PC238-AA	$350.
☑DZQ11-M/Cab.Kit	$395.
☑H9642-JA	$695.
☑BA23-A w/Floor Stand	$795.
☑VT320 (NEW)	$435.
☑MVMS 4.7 Med/ Doc Kit	$525.

Call Today
603/893-4200

XYONIX INC.

GTEX FINANCIAL GROUP, Inc.

IBM

BUY SELL
LEASE

PS/2 OPERATING
LEASES

3084 3090
PERIPHERALS

OEM/PCM
LEASES

800-888-7568
FAX 214/783-1379

Member CDLA EST. 1978

HONEYWELL
LEVEL 6 DPS 6
SERIES 16

- Complete Minicomputer Line -- New & Used
- All Peripherals & Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guaranteed
- Immediate Delivery Low Prices
- HDS 5 and HDS 7 Compatible Terminals

The Recognized Leader
in Honeywell Minicomputer
Sales and Support

BCS
BOUDREAU
COMPUTER SERVICES
100 Bearfoot Road
Northboro, MA 01532
(508) 393-6839
FAX 508-393-3781
"Since 1974"

Want to Buy

3287
Printers
or Parts

In as is
or good
working
condition

Call:

Computer
Service
Supply Corp.

603-437-0634
Fax: 603-622-0128

9370's
That's All
We Do!

From 20's to 90's
Most Machines,
Peripherals &
Features
IN STOCK

Call us for a quote
708-831-1255

Executive Infosource
1530 Eastwood Ave., # 100
Highland Park, IL 60035

CDLA Member Computer Dealers & Lessors Association

COMPUTERWORLDS's
CLASSIFIED MARKETPLACE
Examines the issues while Computer Professionals
examine your message.
Call for all the details.
(800) 343-6474
(In MA., 508/879-0700)

Computerworld's

Classified Marketplace

needs only 6 days
notice to run your ad!

When you're selling, you want your advertising to hit the market quickly and frequently. You can't afford to wait for an issue that's coming out several weeks – or – months – into the future. With Computerworld, there's no waiting for the next available issue because we've got one waiting for you every week. What's more, your ad can appear in the Monday issue of Computerworld if you order it as late as 6 days prior to the issue (Tuesday).

So if you're selling computer products or services, advertise in the newspaper that won't keep you waiting. Advertise in Computerworld's Classified Marketplace!

For more information, call:

800/343-6474
(in MA, 508/879-0700).

Bids/Proposals/Real Estate

FOR: LEASE OR SALE

DATA CENTER

Location Ft. Lauderdale
Boca Raton, Florida

- Over $2,000,000 of leasehold and specialty equipment.
- 12,800 sq. ft. with elevator
- Security, Halon, U.P.S. Liebert Systems
- Approximately 7,000 sq. ft. computer flooring
- Approximately 500 telephone lines and P.B.X. switch

For more information contact:

Joe Stapleton
Phone: 305-563-7733
305-943-5305

METROPOLITAN TRANSPORTATION AUTHORITY NOTICE is hereby given that the Metropolitan Transportation Authority will receive proposals for the following article as indicated below, on which date they will be opened and reviewed at the indicated time at the Authority's offices at 347 Madison Avenue, New York, NY 10017 (5th Floor). Copies of such forms and specifications may be secured from Ms. Angie Phifer, Secretary, Department of Procurement Services, Metropolitan Transportation Authority, 347 Madison Avenue, New York, NY 10017.

The following is the RFP's evaluation criteria in the order of importance:

1. The degree the product meets the requirement of the Technical Specification which is not addressed in Criteria 2 and 3 below.

2. The degree that the product provides for data rationalization of COBOL code which is under IDMS.

3. The degree that the product provides for data rationalization of COBOL code which is not under IDMS.

4. The degree that the product can analyze multi-program systems.

5. The vendors overall responsiveness to the RFP package. This criteria will include but not be limited to providing the information requested, acceptance of MTA Terms and Conditions and pricing submitted as requested.

RFP#	DATE	TIME
6-01-90187-0	July 18, 1990	3PM

FOR: "License for an Off-the-Shelf Systems Documentation and Analysis Tool Specificetion (Reverse Engineering) Software Product.

STATE OF CONNECTICUT
D.A.S. BUREAU OF PURCHASES
Request For Proposals
(R90-006)

For the Design, Printing,
and Mailing
of
Health Profession License Forms
and
License Renewal Notice Forms
for the
State of Connecticut
Department of Health

Interested vendors should contact below indicating reference number:

Data Processing
Procurement Division
340 Capitol Avenue, 1st floor
Hartford, CT 06106
(203) 566-3304

PETER W. CONNOLLY
ADMINISTRATIVE MANAGER

STORE/OFFICE
CONFERENCE
SPACE
(Manhattan, New York City)

For Rent In Large
TECHNOLOGY CENTER
for Computer
Products & Office
Equipment
Plus
One Stop
Full Services

Tel: 212/941-9005
FAX: 212/966-8565

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 301 N. Lamar St., 301 Building, Suite 508, Jackson, MS 39201 for the following equipment and services:

General Request for Proposal No. 1800, due Monday, July 16, 1990 at 3:30 p.m. This is a general RFP to be used through January 1991 for the acquisition of Apple Computer, Inc. and compatible microcomputer workstations, peripherals and software for the STATE OF MISSISSIPPI.

Request for Proposal No. 1821, due Tuesday, July 3, 1990 at 3:30 p.m. for the acquisition of a front end processor for JACKSON STATE UNIVERSITY.

Request for Proposal No. 1822, due Thursday, July 5, 1990 at 3:30 p.m. for the acquisition of a Program Management/Productivity tool for JACKSON STATE UNIVERSITY.

Request for Proposal No. 1823, due Thursday, July 5, 1990 at 3:30 p.m. for the acquisition of a High Performance Disk File Manager for JACKSON STATE UNIVERSITY.

Request for Proposal No. 1824, due Thursday, July 5, 1990 at 3:30 p.m. for the acquisition of a Spool Data Management System for JACKSON STATE UNIVERSITY.

Request for Proposal No. 1826, due Thursday, July 12, 1990 at 3:30 p.m. for the acquisition of a UNIX-based multi-user system capable of running the existing Florida Management Advisory Services Home Health Services sofware for the STATE DEPARTMENT OF HEALTH.

Request for Proposal No. 1827, due Tuesday, June 26, 1990 at 3:30 p.m. for the acquisition of ASCII terminals, multiplexors and modems for the MISSISSIPPI BOARD OF MEDICAL LICENSURE.

Request for Proposal No. 1829, due Thursday, July 5, 1990 at 3:30 p.m. for the acquisition of a maintenance contract for an Amdahl 6280 Disk Subsystem for JACKSON STATE UNIVERSITY.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Patsy Stanley @ (801) 359-2804

Go Shopping in...
Computerworld's

CLASSIFIED MARKETPLACE

Call for all
the details

(800) 343-6474
(In MA., (508) 879-0700)

Peripherals/Supplies

9-Track Tape
For Your
IBM
PC/XT/AT/PS-2™

Read 1600 or 6250 bpi 9-track tapes from a micro, mini or mainframe in EBCDIC or ASCII as mirror image or by individual files.
Use the 2000 PC™ for disk backup, data interchange or archival storage.

PC/XT/AT/PS-2 ara trademarks of IBM.

..First In Value
DIGI-DATA CORPORATION
8580 Dorsey Run Road
Jessup, MD 20794-9990
(800) 782-6395
FAX (301) 498-0771

Computerworld's

Classified Marketplace

gives you buyers with
extensive purchase influence.

That's because Computerworld's Classified Marketplace reaches MIS/DP professionals who have extensive involvement in volume purchasing. In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the entire range of information systems, as well as related products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers buyers with volume purchasing influence. Advertise in Computerworld's Classified Marketplace!

For more
information, call

800/343-6474
(in MA, 508/879-0700).

Conversions

CONVERSION EXPERTS

MACRO TO COMMAND

Automatically convert your CICS Macro to CICS Command.

- License Product
- Per Line Service
- Turn-Key Conversion

Neosynetics, Inc. offers a family of integrated software tools to:

- Translate Languages
- Convert Data
- Create JCL

Products & services on your site or ours, fixed fee or T&M.

IBM Business Partner

NEOSYNETICS, INC.
2860 Des Plaines Avenue,
Suite 375
Des Plaines, Illinois 60018
708/299-0900

When it's time to get
SERIOUS
about document and data
CONVERSION

MMC has the skill and experience to help you get from old system to new quickly and cleanly. This industry pioneer provides both service bureau and in-house conversion solutions. The firm's R&D has produced many unique and unusual capabilities. Large and technically challenging projects are a specialty.

'We do the tough ones!'

Muller Media Conversions, Inc.
32 Broadway, New York, NY 10004
(212) 344-0474 fax: (212) 968-0789

Computerworld's

Classified Marketplace

showcases your ad by product category!

Whether it's used equipment, software, time, services or just about any other category of computer product or service, *Computerworld's* Classified Marketplace is organized to make your ad visible and to make buying your product easy.

Just look!

Computerworld's Classified Marketplace Product Categories

software
hardware
conversions
time/services
buy/sell/lease
communications
peripherals/supplies
business opportunities
bids/proposals/real estate
graphics/desktop publishing

So if you're selling computer products or services, advertise in the newspaper that showcases YOUR product or service. Advertise in *Computerworld's* Classified Marketplace!

For more information, call

800/343-6474
(in MA, 508/879-0700)

Time/Services

Quality Outsourcing

We Match Any Reasonable Offer

- ◆ IBM Mainframe/Peripherals
- ◆ Full Technical Support
- ◆ 24 hour Help Desk w/ 800#
- ◆ Database Conversions
- ◆ Automated Print Distribution
- ◆ S/38 Disaster Recovery
- ◆ Consulting Services
- ◆ Network Specialists
- ◆ Capacity Planning
- ◆ Automated Operations
- ◆ Laser Printing

Resources Available Include:

MVS/XA, VM/XA, CMS, CICS, DB2/QMF, TSO/E, ISPF/PDF, SAS, Librarian, IBM IN, PANVALET, EASYTREIVE, Telenet/Tymnet, TOP SECRET

ITAC **Call: (201) 216-3216**
INFORMATION TECHNOLOGY ALLIANCE CORPORATION

CICS CONVERSIONS TECHNICAL PROJECTS

Assembler to COBOL
CICS Macro to Command
Assembler development
VTAM application programming
Assembler maintenance services
CICS 3.1 Exit revisions

Brask Technologies, Inc.

Principal involved in the development of two ICP million-in-one award-winning products.

For more information contact: Dave Brask
708/566-2252

NEW & USED RAISED FLOORING

Immediate Delivery

Quality Installation

Raised Computer Floors
One Charles Street
Westwood, NJ 07675

(201) 666-8200
FAX (201) 666-3743

REMOTE COMPUTING

- We locate COMPUTER TIMESHARING.
- OUTSOURCING SPECIALISTS.
- ALL mainframes.
- We find your LOWEST prices.
- NEVER a charge to the Buyer.
- Our fees paid by the Seller.
- Nationwide service since 1968.

CALL DON SEIDEN AT

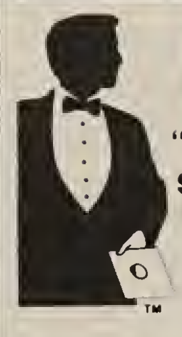
COMPUTER RESERVES, INC.
(201) 688-6100

CLASSIFIED MARKETPLACE

Where Computer Professionals Shop

(800) 343-6474
(In MA, 508/879-0700)

CORPORATE DISK COMPANY ™
CD TECHNOLOGIES INC • CD MARKETING INC



TAPE AND DISKETTE DUPLICATION

"THE *ONE STOP SHOP* FOR SOFTWARE DEVELOPERS"

STOP going to 5 different suppliers! It can all be done with one easy phone call.

Our Services Include:

- Special Silk Screening Process for 3 1/2" and 5 1/4" Diskettes. We can print right on the shutter of each 3 1/2" disk or right on the jacket of 5 1/4" disks!!
- **Printed Diskette Sleeves**
- **Printed Diskette Labels**
- Printed Binders & Slipcases
- Printed Documentation Pages
- Duplication Equipment
- Low Cost Diskettes

"You have to make but one phone call to the Corporate Disk Company and can consider the job done."

In Illinois (708) 439-DISK
Nationwide 1 (800) 634-DISK

© 1989 by CD Marketing Inc.

Outsourcing . . . When Time, Capital And Quality Count

Litton Computer Services frees you from the day-to-day grind of data center management . . . so you can concentrate on your business.

Cost-effective, fixed-price solution to in-house computing with the resources and expertise necessary to fit your needs.

- ► Multiple Data Centers
- ► Large-Scale Information Systems
- ► Nationwide Network
- ► Remote Facilities Management
- ► Migration Specialist
- ► Operating System Conversions
- ► Integrated Financial Systems
- ► Major third Party Software Packages

Contain your costs without losing control . . .

CALL 1 800 PLAN LCS.
(1 800 752-6527)

Litton
Computer Services

COST-EFFECTIVE COMPUTING SERVICES for TODAY and.... TOMORROW

COMDISCO COMPUTING SERVICES CORP.

Provides you with:

REMOTE COMPUTING
COMPUTER OUTSOURCING
FACILITY MANAGEMENT

Featuring:

- IBM® CPUs and Peripherals
- Systems Software: MVS/XA, TSO/E, ISPF/PDF, CICS, VM/XA, VM/SP, HPO, CMS
- Application Software: Database Management, Application Development, 4/GLs, Graphics, Statistical Analysis
- Multiple Communications Methods
- Technical Support
- Automated Tape Handling
- ULTRA-Secure Data Center
- Advanced Laser Printing
- Pricing to fit your needs

Call: Robert Marino
201-896-3011

COMDISCO

COMDISCO COMPUTING SERVICES CORP.
430 Gotham Parkway, Carlstadt, NJ 07072

VAX SERVICES

- TRAINING, INSTALLATION, SALES AND SUPPORT
  - Wordperfect 5.0 for VAX/VMS
  - Wordperfect "Office" for VAX/VMS
  - Wordperfect PlanPerfect for VAX/VMS
  - Wordperfect All-In-One Integration
  - Wordperfect upgrade 4 2 to 5.0
  - VMS System Management
  - VMS Installation
- EXPERTS IN:
  - Office Automation/Feasibility Studies
  - Document Management Systems
  - VAX/VMS, Novell
  - Networking, VAX - PC Connectivity
- INSTALLATION
- SOFTWARE DEVELOPMENT
- DATA CONVERSION
- HARDWARE MAINTENANCE
- DATA WIRING (Unshielded Twisted Pair, Thin Wire, ETC.)
- TIMESHARING
- SITE SUPPORT/OUTSOURCING
- EXECUTIVE PLACEMENT

Omnicomputer, Inc
1440 Broadway
New York, NY 10018
Tel. (212) 944-9230
Fax (212) 869-2846

Time/Services

Let Us Be Your Data Center

Get high-quality computing service that can make a difference to your bottom line. From **MCN Computer Services.**

State of the art IBM Compatibility:

MVS-ESA

VM/XA
TSO E
ROSCOE
CICS
IMS
IDMS/R
DB2
QMF
PROFS

Programmer Productivity Aids:

FILE-AID
CICS PLAYBACK
dBUG-AID
ABEND-AID
CICS ABEND-AID

We provide state-of-the-art systems, software and security for major clients across the country. And we deliver high-quality, cost-effective services that include:

- Operations 7 days a week 24 hours a day
- Network Management

For more information, call Lisa Walker at:
1-800-521-0444

MCN
Computer Services, Inc.

5225 Auto Club Drive
Dearborn, MI 48126

REMOTE COMPUTING OUTSOURCING

- MVS/XA
- CICS
- DB2
- VM/370
- TSO
- IMS/DBDC
- DOS/VSE
- CMS

OVER 150 SOFTWARE PRODUCTS

- DEVELOPMENT
- PRODUCTIVITY
- DEBUGGING
- PERFORMANCE

- TELENET
- SEARSNET
- TYMNET
- IBM INFORMATION NETWORK

EXTRAORDINARY CUSTOMER SERVICE
MIGRATION MANAGEMENT

GIS INFORMATION SYSTEMS, INC
815 Commerce Drive, Oak Brook, IL 60521

708-574-3636
New England 617-595-8000

SUNGARD
COMPUTER SERVICES

. OUTSOURCING EXPERTISE

. FIXED PRICE COMPUTING

. ECONOMICAL PRICES - SIGNIFICANTLY LESS THAN IN-HOUSE

.IBM 3090 COMPUTERS WITH MVS/ESA, AND VM TECHNOLOGY

. EXTENSIVE NATIONWIDE TELCOM NETWORK

. EXTENSIVE LIBRARY OF THIRD PARTY SOFTWARE

. PROFESSIONAL SERVICES FOR APPLICATION SUPPORT & DEVELOPMENT

FOR MORE INFORMATION CALL:
(800) 441-4203 (215) 387-3890
(212) 943-9540

SUNGARD COMPUTER SERVICES INC.
1285 DRUMMERS LANE
WAYNE, PA 19086

OUTSOURCING AND REMOTE COMPUTING

- IBM MVS/XA Environment
- DB2, IDMS/R, Model 204 and 4GLs
- Professional Support Staff
- Experienced Migration Management Team
- Simplified Pricing and Invoicing
- AS/400
- Full Supporting Services
  - Media Conversion
  - Laser & Impact Print Facility
  - Application Programming
- Technical Support
- 24 Hours a Day – 7 Days a Week

May & Speh, inc.
1501 Opus Place, Downers Grove, IL 60515-5713
1(800) 729-1501
For More Information Contact Tony Ranieri

ICOTECH

MVS/XA
TSO/ISPF/SDSF
CICS
ADABAS
LIBRARIAN
VTAM
FILE-AID
INTERTEST
SAS
$AVRS
DB2
SIMWARE
ACF2
ADC2

- 24 hour availability
- International access
- Superior technical support staff
- Uninterrupted Power Supply
- Certified on-site vault
- Disaster recovery
- Impeccable service

Call Now - Solve Your Computing Worries

TODAY & TOMORROW!

(201) 685-3400

OUTSOURCING-PROCESSING SERVICES

MVS/TSO · VSE · VM/CMS · CICS · ISPF · VTAM
SQL · DB2 · QMF · SAS · Laser Printing

- Top Management Involvement With Every Account
- Low Cost Provider In Los Angeles

call: Stan Feinstein, Exec. V.P.

800-899-5178

PYRAMID
Pyramid Information Services, Inc.

ON-LINE WITH COMPUSOURCE

- Multiple centers
- RACF, CICS, IMS
- Volume & term discounts
- Full technical support
- Disaster recovery services
- MVS/XA, VM, DOS
- SAS, DB2
- Worldwide access
- Laser printing

COMPUSOURCE
(919) 469-3325

Graphics/Desktop Publishing

PC SCREEN TO BIG SCREEN

Look to BOXLIGHT for the Largest Selection of LCD Pads

TRUE COLOR SYSTEMS from $4995
MONOCHROME SYSTEMS from $599

Solutions for VGA, EGA, CGA
All Macs, DEC VT 100s, 220s
IBM Terminals and More

BOXLIGHT™ CORPORATION

VISA, M/C, AMEX, COD
206/697-4008

Computer-Based Presentation Systems Since 1984

Software

FREE BUYER'S GUIDE

When you need programmer's development tools, Programmer's Connection is your best one-stop source. We are an independent dealer representing more than 400 manufacturers with over 1200 software products for IBM personal computers and compatibles including: COBOL compilers and utilities, relational databases, and much more. Call today to receive a **FREE** comprehensive Buyer's Guide, and find out why Programmer's Connection is your best connection for software tools.

Programmer's Connection
7249 Whipple Ave NW
North Canton, Ohio 44720

US	800-336-1166
Canada	800-225-1166
International	216-494-3781
FAX	216-494-5260

Computerworld's

Classified Marketplace

gives you reach to over 612,000 potential buyers!

And this audience is even verified by the Audit Bureau of Circulations in the only independently audited pass-along survey of its kind. What's more *Computerworld's* Classified Marketplace penetrates buying companies in all major industries. That's because *Computerworld's* total audience blankets key vertical markets that are major users – and major buyers – of computer products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers over 612,000 potential buyers. Advertise in *Computerworld's* Classified Marketplace!

For more information, call

800/343-6474
(in MA, 508/879-0700)

Business Opportunities

WE'RE LOOKING FOR A FEW GOOD PARTNERS!

We're Legato Systems, Inc., a leader in network application software. And we're looking for dealers and technical consultants who want to make good money by selling a hot, much-needed new network administration tool for Sun/UNIX networked environments.

As a Legato dealer, you'll be provided with training, outstanding support and sales referrals from our experienced sales and technical staffs.

For more information, call (415) 329-7891 and ask for Dennis.

Legato Systems, Inc.
260 Sheridan Ave., Palo Alto, CA 94306
(415) 329-7880 ■ FAX (415) 329-8898

612,00 MIS/DP Professionals see the

CLASSIFIED MARKETPLACE

each week. Call for advertising information:

(800) 343-6474
(In MA., 508-879-0700)

Advertise Your Products In The

Classified Marketplace

Featuring

☐ Buy/Sell/Lease
☐ Hardware
☐ Software
☐ Peripherals/Supplies
☐ Bids/Proposals/Real Estate
☐ Graphics/Desktop Publishing
☐ Time/Services
☐ Business Opportunities
☐ Communications
☐ Conversions

Reach over 612,000 information systems professionals by placing your company's message in

Classified Marketplace.

Name: ____________________
Title: ____________________
Company: ____________________
Address: ____________________
City: ____________________
State: ____________________ Zip: ____________________
Telephone: ____________________
Ad Size:
________ columns wide x ________ inches deep.
☐ I am enclosing ad material with this form.

Return this form and advertising material to:

Computerworld
Classified Marketplace
375 Cochituate Road, Box 9171
Framingham, MA 01701-9171

(800) 343-6474
(In MA., (508) 879-0700)

Creating off-the-shelf training

Firms roll their own video and demo programs for inexpensive tutorials

BY JESSICA KEYES
SPECIAL TO CW

Alexander Pope once said that "a little learning is a dangerous thing." Though he didn't have computer training in mind, his comment is certainly applicable to it.

The basic problem with computer training is that its message is short-lived. Information systems professionals and personal computer users are equally likely to retain little of what they are taught in expensive seminars. In fact, studies have indicated that the human mind retains less than 10% of what it hears.

Education is too expensive for us to throw 90% of it down the drain. Don't get me wrong: I'm not advocating an end to seminars and classes. However, several less expensive forms of "off-the-shelf training" can serve as adjuncts to live training and as substitutes for it in certain situations.

By off-the-shelf training, I mean the student can grab a video or a set of disks from a library and learn by himself, at his own pace. He can start and restart a session as many times as he wants without slowing down anyone else.

This approach can help drive home the 90% of training that people don't retain the first time around, and it can stand in when live training isn't possible or practical. Do you have programmers scattered around the country in places where training facilities are not readily available? Just ship them a disk or videotape.

A lot of progress has been made on the videotape front since I was a programmer and watched countless dry and boring tapes of men with white shirts, bow ties and crew cuts teaching assembler and similar tools. Videotape training has been spruced up; instructors speak better and camera movements are more sophisticated. Today, it also covers esoteric subjects that can make a techie salivate: expert systems, neural networks, the C language and even the new C++ language.

What do you do if there is no videotape training for your topic of choice? One solution is to create your own. It's not as difficult as it sounds. With camcorders available for purchase or rent, your company might be wise to make use of them as an educational tool. One organization I know of that was training several hundred users in a new homegrown mainframe decision-support system held live training sessions, but managers found they needed to reinforce the material, so they videotaped their sessions.

Most camcorders tape from PCs or CRTs quite nicely, as long as the camcorder is set up on a tripod and focused carefully. A prepared script helps, too.

What is true for videotape training is also true for disk-based tutorials. By now, nearly every computer user has tried one of countless such programs, which often come with packaged applications. They, too, are available for a wide range of subjects, including telecommunications, SQL, C and the Ada language.

Still, the list may not be exhaustive enough. You may need to develop a program for a homegrown system or a commercial product for which disk-based training is not available. As with videotapes, you can do it yourself; there are many tools available in the market to help you.

There are two types of software that you can use for this task. The first is called demonstration software. One of the nice things about it is its ability to capture screens. Let's say you just wrote a payroll processing system. If it is on a host processor, you use emulation software to view screens on a PC. Using the screen-capture utility, you capture the pertinent screens by hitting a combination of PC keys. Then you retrieve the screens and enter text that will guide the novice payroll employee through the system's commands.

When the user boots up the "Payroll Trainer," he can walk through the steps necessary to log on to the payroll system and enter data on a new employee, modify records or even generate checks. There are a handful of popular demo programs on the market; they cost about $300.

You can develop a more advanced form of PC-based training using an authoring system. Authoring systems are complex packages that provide elegant features such as scripted tutorials, pull-down menus, prompt windows, animation, music, sound and even synthesized speech.

With this type of software, you can build interactive instruction in everything from an introduction to computers for naive end users to Cobol for programmer trainees and expert system methodologies for advanced systems professionals. On average, the authoring programs cost approximately $500. They are geared for use by trainers, who will usually need a day or two to get started with one.

Pope was right. A little learning is a dangerous thing. We must train completely and effectively. To educate IS staff members and computer users in that manner, the people in charge must employ a variety of methods. Off-the-shelf programs might have made Pope sit up and take notice.

Keyes is president of New Art, Inc., a management and computer consulting firm in New York.

COMPUTERWORLD's

July
Training Editorial Topics

2 **Developing a training philosophy.**
Special Feature:
The Pharmaceutical Industry
Ad Close: June 26

9 **Teaching IS about corporate culture.**
Special Report:
IS in Japan
Ad Close: July 3

16 **Training Cobol programmers for transition to another language.**
Product Spotlight:
Executive Information Systems
Ad Close: July 10

SQL TRAINING
LOGICAL DATABASE
DESIGN
Computer Based Training
for DB2 and ORACLE
Call 800-333-1601 or 617-262-4933
for Free catalog and demo diskette.
Relational Courseware, Inc.
The Prudential Tower, Suite 200
Boston, MA 02199

CUSTOM IN-HOUSE TRAINING
o DB/2 o SQL o CICS o VSAM o DL/I
o VSAM Tuning o MVS/XA/ESA o Operations
o Data Communications o Local Area Networks
o DOS/VSE o TSO/ISPF o COBOL o JCL
Increase the productivity of your staff with Practical, Proven, On-site Training Systems !
Jeff Markiewicz & Associates
"Data & Communication Specialist"
For Course Information Call (301) 282-8799

Computerworld's
Training Pages
give you
cost-effective
reach!

That's because *Computerworld's* training Pages give you the most widespread reach available to management and staff in America's MIS departments - the departments that directly control America's MIS training dollars.

And for good reason *Computerworld* is the *best read publication* in America's MIS departments - the departments that directly control nearly 80% of the $192 billion US market for all ranges of computer software, hardware, data communications equipment, services and staff.

What's more *Computerworld's* Training Pages lead buyers to your ad with a weekly Training editorial feature that anchors the section and your ad. Whether it's topics like "Unraveling SQL for MIS pros," or "Finessing the training contract," *Computerworld's* Training Pages deliver pertinent, advice-oriented editorial to *Computerworld's* readers every week.

THE 1990
COMPUTER
TRAINING
&
SUPPORT
CONFERENCE
October 28th-31st
Orlando, Florida
Elliott Masie
Conference Director
free brochure:
1-800-34-TRAIN
1-315-354-4092

Instructor-Led
Mainframe Training
and Development
for IBM and
related products.
interact
INFORMATION SERVICES, INC
914-332-6100
(Within NYS)
800-628-5471
(Outside NYS)

GET IT FROM
THE PROS AT
TECHINSIDER
Over 15 courses,
mainframe and
PC, covering
topics from C to
COBOL to AI
to CICS to DB2
(212) 362-0559

SALES OFFICES

Publisher/Fritz Landmann

Senior Vice-President/National Sales Director/Kevin Harold, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

BOSTON: Regional Vice-President - North/David Peterson, Sr. District Managers/Bill Cadigan, Sherry Driscoll, District Manager/John Watts, Sales Assistants/Alice Longley, Lisa Bonaccorso, Linda Clinton, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

CHICAGO: Regional Vice-President - Midwest/Kevin McPherson, Senior District Manager/Larry Craven, Sales Assistants/Kathy Sullivant, Karol Lange, **COMPUTERWORLD**, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (708) 827-4433

NEW YORK: Regional Vice-President - East/Bernie Hockswender, District Managers/Fred LoSapio, Paula D'Amico, Sales Assistants/Susan Kusnic, Patricia DeBiase, **COMPUTERWORLD**, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

LOS ANGELES: Regional Vice-President - West/Jan Harper, Southwestern Regional Manager/Carolyn Knox. Sales Assistant/Bev Raus, **COMPUTERWORLD**, 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 261-1230

SAN FRANCISCO: Regional Vice-President - West/Jan Harper, Senior District Managers/Ernie Chamberlain, Michela O'Connor Abrams, District Manager/Alicia Saribalis, Sales Assistants/Chris Kobayashi, Nurit Zekman, Carol Lacasse **COMPUTERWORLD**, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555

ATLANTA: Regional Vice-President - East/Bernie Hockswender, District Manager/Melissa Christie Neighbors, Sales Assistant/Debra Brown, **COMPUTERWORLD**, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758

DALLAS: Regional Vice-President - Midwest/Kevin McPherson, Southeastern District Manager/Darren Ford, Sales Assistant/Brenda Shipman, **COMPUTERWORLD**, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

WASHINGTON, D.C.: Regional Vice-President - East/Bernie Hockswender, District Manager/Paula D'Amico, **COMPUTERWORLD**, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 967-1350

CLASSIFIED ADVERTISING SALES:
Classified Advertising Director/John Corrigan, Marketing Director/Derek E. Hulitzky, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

PRODUCT CLASSIFIED ADVERTISING:
East: Account Manager/Paul Bonarrigo, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

West: Account Executive/Bill Creonte, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES:
New England: Regional Manager/Nancy Percival, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700, Account Executive/Andrew Rowe, (800) 343-6474, In MA (508) 879-0700

Mid-Atlantic: Regional Manager/Valerie Galbo, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 967-1350, Sr. Account Executive/Jay Novack, (800) 343-6474

South-Atlantic: Regional Manager/Katie Kress, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sr. Account Executive/Pauline Smith (800) 343-6474

Midwest: Regional Manager/Pat Powers, O'Hare Corp. Twr 1, 10400 W. Higgins Rd., Ste. 300, Rosemont, IL 60018 (708) 827-4433, Account Executive/Ellen Casey (800) 343-6474

West: Regional Manager/Barbara Murphy, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164, Account Executive/Christopher Glenn (800) 343-6474

DIRECT RESPONSE CARDS:
East: Account Manager/Norma Tamburrino, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

West: Account Executive/Jill Halbert, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164

IDG INTERNATIONAL MARKETING SERVICES:
Managing Director/Frank Cutitta, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

West Coast Marketing Manager/Leslie Barner, 3350 West Bayshore Road, Suite 201, Palo Alto, CA 94303 (415) 424-1001

CW PUBLISHING/INC.

An International Data Group Company

Fritz Landmann
President & Publisher

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 508-879-0700, Telex: 95-1153, FAX: 508-872-8564

Val Landi
Senior Vice-President
Special Publications Division

Kevin Harold
Senior Vice-President
National Sales Director

Matthew Smith
Senior Vice-President
Chief Financial Officer

FINANCE **Controller**, Mark Sullivan.
SALES **Advertising Director**, Carolyn Novack. **Classified Advertising Director**, John Corrigan.
Marketing Director, Derek E. Hulitzky.
Display **Advertising Production Manager**, Maureen Hanley. **Classified Operations Manager**, Cynthia Delany.
MARKETING **Vice President/Business Development**, Jan Harper. **Manager, Marketing Communications**, Mary Doyle. **Account Manager, Marketing Communications**, Elizabeth Phillips. **Manager, Trade Show & Conventions**, Audrey Shohan.
CIRCULATION **Director of Circulation Management**, Maureen Burke. **Director of Circulation Promotion**, Carol Spach.
PRODUCTION **Vice President/Manufacturing**, Leigh Horneth. **Director of Publishing Technology**, Carol Polack.
Production Manager, Beverly Wolff.
PUBLISHER'S OFFICE **Assistant to the President**, Karen Eliott. **Assistant to the Senior Vice-President**, Libby Levinson.

GLOBAL LEADERSHIP NETWORK

FOREIGN EDITORIAL/SALES OFFICES

ARGENTINA: Ruben Argento, CW Communicaciones S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

ASIA: S.W. Chan, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone: (011) 852 S 861 3238. FAX: (011) 852 5 86 10953.

AUSTRALIA: Alan Power, IDG Communications Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74752 (COMWOR). FAX: (011) 61 2 439 5S12.

AUSTRIA: Manfred Weiss, CW Publikationen Verlags Ges.m.b.H., Zieglergasse 6, A-1070 Wien, Austria. Phone: (011) 43-222-93-16-31-0. Telex: (847) 115542 (SCH/A) FAX: (011) 43 222 93 05 08 33.

BRAZIL: Ney Kruel, Computerworld do Brazil Ltda, Praca Floriano, 19/26 Andar, 2031 Rio de Janiero, RJ Brazil. Phone: (011) 5S 21 240 8225. Telex: (391) 21 30830 BR. **Sao Paulo:** Computerworld do Brazil Ltda., Rua Joaquim Floriano, 488/3 andar-CEP 04534, Sao Paulo, Brazil. Tel: (011) 5S 11 853 8149. Telex: (391) 1132017 (WORD BR).

COLOMBIA: Rodrigo Ruentes, La Nueva Ley, Transv. 42B No. 99 A/66, Apartado 5850S, Bogota, D.E. Columbia. Tel: (011) 571 271 516S.

DENMARK: Preben Engell, IDG Danmark A/S, Krujmtappan 4 DK-2500 Valby Denmark. Tel: (011) 45 36 442800. Telex: (855) 31566. FAX: (011) 4S 36 442033.

FRANCE: Francois Chaussonniere, IDG Communications S.A., Immeuble La Fayette, 2, Place des Vosges, Cedex 65, 92051 Paris la Defense, France. Tel: (011) 33 1 4904 7900. Telex: (842) 613234F. FAX: (011) 33 1 4904 7800.

HUNGARY: Dezso Futasz, Computerworld Informatika Co., Kft. Pf. 386, 1S36 Budapest, Hungary, Phone: (011) 3611 228 458. Telex: (861) 225307 (KSHP H). FAX: (011) 3611 423 965.

INDIA: Michael Sales, Media Transasia India Ltd., 102 Anand Lok, New Delhi 110049, India. Tel: (011) 91 11 644 0110. FAX: (011) 91 11 643 2950.

ITALY: Umberto Costamagna, Computer Publishing Group CPG, Via Vida 7, 20127 Milano, Italy. Phone: (011) 39-2-2613432. Telex: (843) 335318. FAX: (011) 39 2 284 0737.

JAPAN: Jim Povec, IDG Communications/Japan, Kioicho TBR Bldg., 5-7 Kojimachi, Chiyodaku Tokyo 102, Japan. Tel: (011) 81 3 222 6411. Telex: (781) 252 4217. FAX: (011) 81 3 222 6566.

MEXICO: Henry Morales, Computerworld Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Tel: (011) 52 5 514 4218 or 6309. Telex: (383) 177 1300 (ACHAME). FAX: (011) 525 511 4860.

THE NETHERLANDS: Wout Berends, IDG Communications B.V., de Paulus Potterstraat 18, 1071 DA Amsterdam, The Netherlands. Tel: (011) 31 20 664 6426/664 5818. Telex: (844) 18242 (CWCOM NL). FAX: (011) 3120 796 006.

NEW ZEALAND: Martin Taylor, IDG Communications Ltd., 2nd Floor, 15 Augustus Terrace, Parnell, Auckland 1, New Zealand. Phone: (011) 64-9-779-902. Fax: (011) 64 9 774 604.

NORWAY: Morten Hansen, CW Norge A/S, Hovinveien 43, 0576, Oslo 5, Norway. Phone: (011) 472 647725. Telex: (856) 76476 (CW NOR N). FAX: (011) 47 268 0152.

PEOPLE'S REPUBLIC OF CHINA: Shen Yao, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Tel: (011) 861 B1 0044. Telex: (716) 222214 (CCW CN).

SINGAPORE: Asia Computerworld Communications, 04-07 Parkway Builders Centre, No.1 Marine Parada Central, Singapore 1544, Republic of China. Phone: (011) 65 34S 8383. Telex: (786) RS 37003 (Comwor). FAX: (011) 65 345 7097.

SOUTH KOREA: Young S. Gimm, Hi Tech Information, Inc. 3rd floor, Youngjae Building, 1600-7 Seocho 3 Dong, Seochogu, Seoul 137-073 Korea. Tel: (011) 82 2 588 8922. FAX: (011) B2 2 582 9823.

SPAIN: Paco Zabala, CW Communications, S.A., Rafael Calvo, 18, 48, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex: (831) 45522 (CW E). FAX: (011) 34 1 419 6104.

SWEDEN: Bengt Marnfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Tel: (011) 46 8667 9180. Telex: (854) 14904 9 (NOVACW). FAX: (011) 46 8665 3132.

SWITZERLAND: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (845) 816 710 (CWCI CH). FAX: (011) 41 1 55 1135.

TAIWAN: David Chu, IDG Communications/Taiwan, 4F-2, No. 137, Fu Hsin South Road, Sec. 1 Taipei, Taiwan, Phone: (011) 886 2 776 4553. Telex: (785) 14142 (ACE-GROUP). FAX: (011) 886 2 721 6444.

LONDON: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WCI 8UT, United Kingdom. Phone: (011) 44 1 831 9252. Telex: (851) 262346. FAX: (011) 44 1 405 2347.

UNITED KINGDOM: Colin Smith, Oliver Smith & Partners, 18 Abbeville Mews, 88 Clapham Park Road, London SW4 7BX, United Kingdom. Phone: (011) 44-1-978-1440. FAX: (011) 44-1-978-1550.

VENEZUELA: Kalman von Vajna Nagy, IDG Comunicaciones C.A., Torre Maracaibo, Piso 10, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30. FAX: (011) 58 2 724970.

WEST GERMANY: Eckhard Utpadel, IDG Communications Verlag AG, Rheinstrasse 26/86, Postfach 40 04 29, 8000 Munich 40, West Germany. Phone: (011) 49 89 360860. Telex: (851) 5215350. (COMW D). FAX: (011) 49 89 3 60 B6257.

INTERNATIONAL DATA GROUP, INC.

Patrick J. McGovern
Board Chairman

Axel Leblois
Vice-Chairman

Walter Boyd
President

William P. Murphy
Vice President/Finance

Computerworld is a publication of International Data Group, the world's largest publisher of computer-related information. International Data Group publishes over 130 computer publications in more than 40 countries. Nineteen million people read one or more International Data Group publications each month. International Data Group's publications include: ARGENTINA'S *Computerworld Argentina;* ASIA'S *Asian Computerworld;* AUSTRALIA'S *Computerworld Australia, PC World, Macworld;* AUSTRIA'S *Computerwelt Oesterreich;* BRAZIL'S *DataNews, PC Mundo;* CANADA'S *ComputerData;* CHILE'S *Informatica, Computacion Personal;* COLUMBIA'S *Computerworld Columbia;* DENMARK'S *CAD/CAM WORLD, Computerworld Danmark, PC World, Macworld, Unix World;* FINLAND'S *Mikro PC, Tietoviikko;* FRANCE'S *Le Monde Informatique, Distributique, InfoPC, Telecoms International;* HUNGARY'S *Computerworld SZT, Mikrovilag;* INDIA'S *Computers & Communications;* ISRAEL'S *People & Computers;* ITALY'S *Computerworld Italia, PC World Italia;* JAPAN'S *Computerworld Japan, Infoworld, Publish;* KOREA'S *Hi-Tech Information/Computerworld;* MEXICO'S *Computerworld Mexico, PC Journal;* THE NETHERLAND'S *Computerworld Netherlands, PC World, Amiga World;* NEW ZEALAND'S *Computerworld New Zealand, PC World New Zealand;* NIGERIA'S *PC World Africa;* NORWAY'S *Computerworld Norga, PC World Norge CAD/CAM, Macworld Norga;* PEOPLE'S REPUBLIC OF CHINA *China Computerworld, China Computerworld Monthly;* POLAND'S *Computers;* SPAIN'S *CIM World, Communicaciones World, Computerworld Espana, PC World, Amiga World;* SWEDEN'S *Computer Sweden, PC/Nyhetherna, Mikrodatorn, PC World, Macworld;* SWITZERLAND'S *Computerworld Schweiz;* TAIWAN'S *Computerworld Taiwan, PC World;* UNITED KINGDOM'S *Graduate Computerworld, PC Business World, ICL Today, Lotus UK, Macworld U.K.;* UNITED STATES' *Amiga World, CIO, Computerworld, Digital News, Federal Computer Week, GamePro, InCider, InfoWorld, International Custom Publishing, Macworld, Network World, PC Games, PC World, Portable Computing, PC Resource, Publish!, Run, Sun Tech Journal;* U.S.S.R.'S *PC World U.S.S.R., Manager, PC Express, Network;* VENEZUELA'S *Computerworld Venezuela, Micro Cmputerworld;* WEST GERMANY'S *Computerwoche, Information Management, PC Woche, PC Welt, Amiga Welt, Macwelt.*

ADVERTISERS INDEX

Apple Computer	38-39
Attachmate	107
AT&T	19, 77, 60-61, C3
Avatar Corp	82
BMC Software	13
Bull Worldwide Information Systems	68-69
Businessland	42-43
Candle Corp	12
CIE America	59
Codex	64
Comparex	55
Computer Associates	3
CW Circulation	102
Data General Corp	90-91
Data Preference	48, 106
Datasouth	74-75
Datasphere, Inc.	36
DCA	65, 66
Digiboard	72
Digital Equipment Corp	20-21, 46-47
Filenet	110
Fischer International	25
Fujitsu	24
Hewlett-Packard	16-17
H&W Computer	29
IBM	35, 70, 104-105
I.D.P.	7
Index Technology	80
Infomart	101
Information Builders	28, 84-85
Informer Computer Terminals, Inc.	73
Ingres Corp	26-27
Integral	C4
IPL Systems	92
Kelly Services	103
Legent Corp	10
Lotus Development Corp	49-51
Micro Focus	41
Microsoft	33, 56-57, 78-79
NCR Corp	96-97
NEC	62-63
Northgate Computer Systems, Inc.	86-87
Nynex	88-89
Oracle Corp	5, 9, 11
Paragon	76
Santa Cruz Operation	44
SAS Institute	52, 67
Software 2000	32
Spectragraphics	54
Sun Microsystems	30-31
3Com Corp	108-109
Tymnet	45
Universal Data Systems	58
Viking Software Services	53
Wang	15
Wyse Technology	40
Xerox	34
Xidex	14

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Have A Problem With Your Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:

COMPUTERWORLD, P.O. Box 2043,
Marion, Ohio 43305-2043.

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Name
Title
Company
Address
City
State
Zip

Address Changes or Other Changes to Your Subscription

All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line. Please allow six weeks for processing time.

Your New Address Goes Here

Name ____________________
Company ____________________
Address ____________________
City ________ **State** ____ **Zip** ____
Address shown: ☐ Home ☐ Business

Other Questions and Problems

It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available:

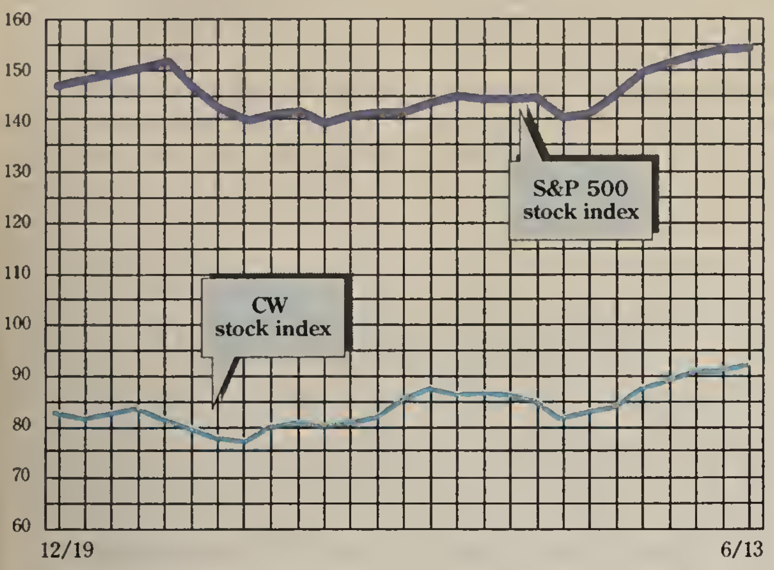
1-800-669-1002

Outside U.S. call: (614) 382-3322

COMPUTERWORLD

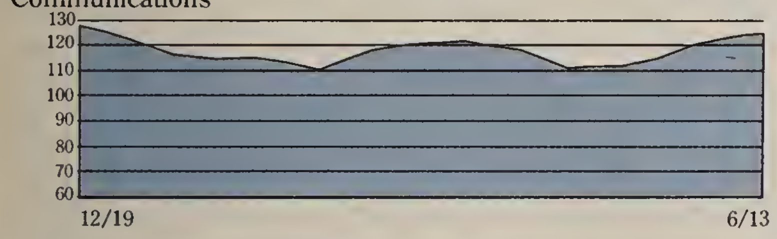
P.O. Box 2043, Marion, Ohio 43305

STOCK TRADING INDEX

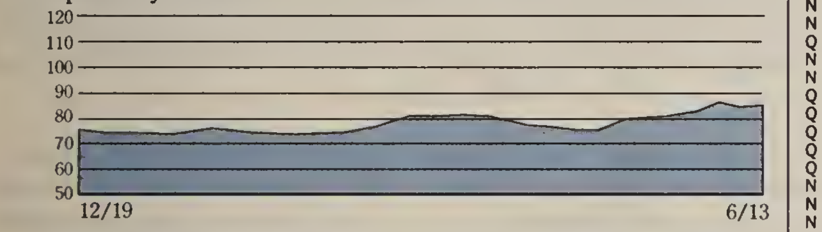


Indexes	*Last Week*	*This Week*
Communications	124.1	**125.4**
Computer Systems	86.5	**86.4**
Software & DP Services	129.3	**131.7**
Semiconductors	62.3	**63.0**
Peripherals & Subsystems	95.2	**98.6**
Leasing Companies	82.6	**84.0**
Composite Index	90.8	**92.1**
S&P 500 Index	154.0	**154.1**

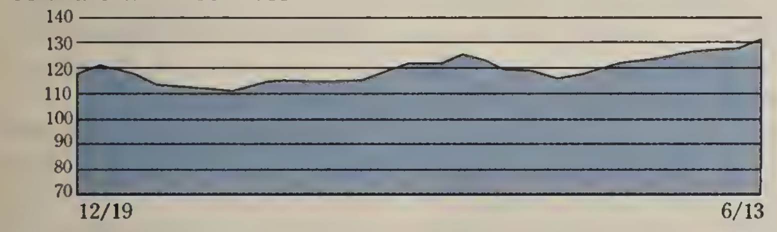
Communications



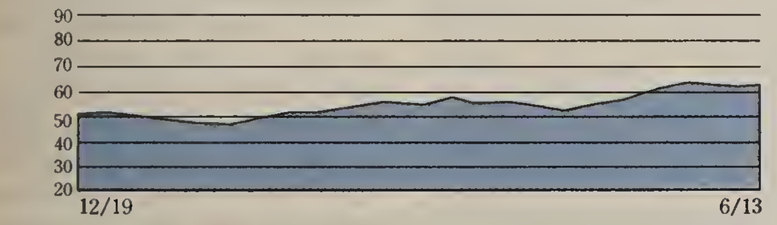
Computer Systems



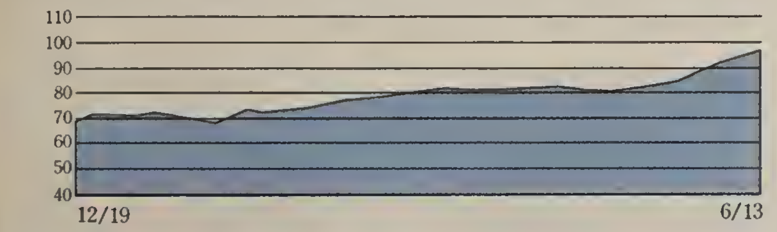
Software & DP Services



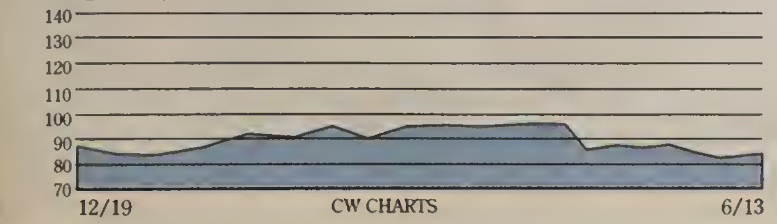
Semiconductors



Peripherals & Subsystems



Leasing Companies



CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 13, 1990

Communications and Network Services

EXCH		52-WEEK RANGE		PRICE CLOSE JUNE 13, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	68	55	65	-0.4	-0.6
Q	ANDREW CORP	26	20	22	-1.0	-4.3
Q	ARTEL COMM CORP	10	5	5.875	0.4	6.8
N	AT&T	47	35	43.125	0.5	1.2
Q	AVANTEK INC	7	2	2.875	0.0	0.0
N	AYDIN CORP	21	14	14.5	-0.3	-1.7
N	BELL ATLANTIC CORP	57	43	52.375	0.1	0.2
N	BELLSOUTH CORP	59	46	56.375	-0.6	-1.1
Q	COMPRESSION LABS INC	16	7	14.875	0.9	6.3
Q	CONTEL CORP	37	23	28.875	-1.8	-5.7
Q	DATA SWITCH CORP	5	2	3.5	0.1	3.7
Q	DIGITAL COMM ASSOC	27	17	24.375	0.3	1.0
Q	DYNATECH CORP	21	15	16	0.3	1.6
Q	FIBRONICS INTNL INC	11	5	10.375	1.3	13.7
Q	GANDALF TECHNOLOGIES	7	2	3.5	0.4	12.0
N	GENERAL DATACOMM INDS	7	3	4.125	0.0	0.0
N	GTE CORP	72	52	64.75	-0.1	-0.2
Q	INFOTRON SYS CORP	13	4	3.75	-0.3	-6.3
N	ITT CORP	65	51	59.375	1.1	1.9
N	M A COM INC	9	3	5	-0.3	-4.8
Q	MCI COMMUNICATIONS CORP	49	31	43.625	1.6	3.9
N	NETWORK EQUIP TECH INC	34	9	9.375	-0.6	-6.3
Q	NETWORK SYS CORP	15	7	14.75	-0.1	-0.8
N	NORTHERN TELECOM LTD	30	18	29.25	0.0	0.0
Q	NOVELL INC	55	24	54.25	4.5	9.0
N	NYNEX CORP	92	75	87.25	-1.5	-1.7
N	PACIFIC TELESIS GROUP	52	39	45.5	-1.4	-2.9
A	PENRIL CORP	7	4	7	0.0	0.0
N	SCIENTIFIC ATLANTA INC	29	17	27.25	0.0	0.0
N	SOUTHWESTERN BELL CORP	65	50	57	-0.6	-1.1
Q	3 COM CORP	21	10	15.375	1.9	13.9
N	U S WEST INC	41	33	37.5	-0.4	-1.0

Computer Systems

EXCH		52-WEEK RANGE		PRICE CLOSE JUNE 13, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	8	4	8.125	0.8	10.2
Q	ALPHA MICROSYSTEMS	8	3	3.375	-0.3	-6.9
Q	ALTOS COMPUTER SYS	8	5	5.375	0.1	2.4
A	AMDAHL CORP	22	11	15.5	0.1	0.8
Q	APPLE COMPUTER INC	50	32	39.75	0.3	0.6
Q	AST RESH INC	26	7	24.5	-0.1	-0.5
N	BOLT BERANEK & NEWMAN	9	4	4.875	0.0	0.0
N	COMPAQ COMPUTER CORP	126	73	125.25	2.1	1.7
N	COMMODORE INTNL	18	6	8.125	-0.4	-4.4
N	CONTROL DATA CORP	23	16	19.5	-0.6	-3.1
N	CRAY RESH INC	53	31	49.375	-1.1	-2.2
Q	DAISY SYS CORP	5	0	0.438	0.0	0.0
N	DATA GEN CORP	19	8	12	0.1	1.1
N	DATAPOINT CORP	6	2	3	0.0	0.0
Q	DELL COMPUTER CORP	13	5	11.125	0.3	2.3
N	DIGITAL EQUIP CORP	103	70	88.125	-2.1	-2.4
N	FLOATING POINT SYS INC	4	0	2.25	0.5	28.6
N	HARRIS CORP	40	28	35	-0.9	-2.4
N	HEWLETT PACKARD CO	58	40	48.25	-0.6	-1.3
N	HONEYWELL INC	103	73	99.75	-0.1	-0.1
N	IBM	122	93	121.375	0.8	0.6
Q	INFORMATION INTL INC	16	12	12.5	-0.8	-5.7
Q	IPL SYS INC	14	5	10	0.1	1.3
N	MAI BASIC FOUR INC	7	2	2.125	-0.4	-15.0
N	MATSUSHITA ELEC INDL LTD	180	123	141.25	-2.9	-2.0
Q	MENTOR GRAPHICS CORP	26	14	24.75	-1.0	-3.9
N	NBI INC	3	0	0.125	0.0	-19.9
N	NCR CORP	72	53	69	0.8	1.1
Q	PYRAMID TECHNOLOGY	36	10	32	-0.8	-2.3
Q	SEQUENT COMP SYS INC	34	11	33.625	1.6	5.1
Q	SHAREBASE CORP	3	0	0.469	0.0	0.0
Q	SUN MICROSYSTEM INC	34	13	33.375	2.4	7.7
Q	SYMBOLICS INC	2	0	0.563	0.0	0.0
N	TANDEM COMPUTERS INC	30	17	24.375	-0.5	-2.0
N	TANDY CORP	49	30	36.625	0.8	2.1
N	ULTIMATE CORP	11	5	7	0.4	5.7
N	UNISYS CORP	27	12	14.875	-0.5	-3.3
A	WANG LABS INC	8	4	4.5	0.0	0.0

Software & DP Services

EXCH		52-WEEK RANGE		PRICE CLOSE JUNE 13, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
Q	AMERICAN MGMT SYS INC	17	11	16.375	2.0	13.9
Q	AMERICAN SOFTWARE INC	26	14	25	0.8	3.1
N	ANACOMP INC	7	2	3.125	0.0	0.0
Q	ANALYSTS INTL CORP	21	14	20.25	0.5	2.5
Q	ASHTON TATE	19	9	11.25	-0.5	-4.3
Q	ASK COMPUTER SYS INC	15	7	9	-0.5	-5.3
N	AUTO DATA PROCESSING	59	39	56.75	-0.4	-0.7
Q	AUTODESK INC	53	33	52.5	3.0	6.1
Q	BMC SOFTWARE INC	29	12	28.75	1.9	7.0
N	BUSINESSLAND INC	14	7	8.875	-0.3	-2.7
Q	COGNOS INC	9	4	8.875	0.3	2.9
N	COMPUTER ASSOC INTL INC	20	11	16	-0.3	-1.5
Q	COMPUTER HORIZONS CORP	16	7	13.5	-1.3	-8.5
N	COMPUTER SCIENCES CORP	59	40	47.375	-1.4	-2.8
N	COMPUTER TASK GROUP INC	14	9	11.5	0.0	0.0
Q	COMSHARE INC	23	15	23.25	2.0	9.4
Q	CORPORATE SOFTWARE	16	8	14.25	1.0	7.5
N	GENERAL MTRS (CLS E)	37	24	36	0.9	2.5
Q	HOGAN SYS INC	7	4	3.75	-0.1	-3.2
Q	INFORMIX CORP	17	8	16.25	-0.3	-1.5
Q	INTELLICORP INC	7	3	6.75	-0.3	-3.6
Q	LEGENT CORP	32	19	28.75	3.1	12.2
Q	LOTUS DEV CORP	39	21	38.625	1.5	4.0
Q	MICROSOFT CORP	79	26	76.5	3.5	4.8
Q	NATIONAL DATA CORP	35	13	15.5	0.0	0.0
N	ON LINE SOFTWARE INTL INC	11	6	7.75	0.0	0.0
Q	ORACLE SYS CORP	28	15	21	-0.1	-0.6
N	PANSOPHIC SYS INC	19	10	14.25	2.1	17.5
Q	PHOENIX TECHNOLOGIES INC	14	2	4.875	1.3	34.5
Q	POLICY MGMT SYS CORP	42	28	41	0.3	0.6
Q	PROGRAMMING & SYS INC	25	16	22.5	-1.0	-4.3
Q	RELATIONAL TECH INC	11	5	6.75	-0.8	-10.0
N	REYNOLDS & REYNOLDS CO	31	19	23.375	0.1	0.5
Q	SAGE SOFTWARE INC	16	7	15.125	0.4	2.5
Q	SEI CORP	21	15	20.5	0.5	2.5
Q	SHARED MED SYS CORP	17	12	12.875	-0.1	-1.0
Q	SOFTWARE PUBG CORP	28	13	26.625	0.6	2.4
N	STERLING SOFTWARE INC	11	7	10	-0.4	-3.6
Q	SUNGARD DATA SYS INC	26	16	23.5	0.8	3.3
N	SYSTEM CENTER INC	26	17	24	1.9	8.5
N	SYS. SOFT INC	29	14	25.75	-1.0	-3.7
Q	WORDSTAR	3	1	0.938	-0.1	-6.2

Semiconductors

EXCH		52-WEEK RANGE		PRICE CLOSE JUNE 13, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	11	7	9.875	-0.4	-3.7
N	ANALOG DEVICES INC	11	7	8	-0.5	-5.9
Q	ANALOGIC CORP	11	8	8.875	0.1	1.4
Q	CHIPS & TECHNOLOGIES INC	26	15	20.125	1.1	5.9
Q	INTEL CORP	49	28	48	0.3	0.5
Q	MICRON TECHNOLOGY INC	25	7	14.375	0.1	0.9
N	MOTOROLA INC	87	51	86.625	3.4	4.1
N	NATL SEMICONDUCTOR	9	5	8	0.0	0.0
N	TEXAS INSTRS INC	44	28	39.875	-1.4	-3.3
A	WESTERN DIGITAL CORP	15	6	14.625	1.5	11.4

Peripherals

EXCH		52-WEEK RANGE		PRICE CLOSE JUNE 13, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLOY COMP	3	0	0.907	0.1	11.6
N	AM INTL INC	6	2	2.5	0.4	17.6
Q	AUTO TROL TECH CORP	5	2	4.375	0.9	25.0
Q	BANCTEC INC	24	13	23	-0.5	-2.1
A	COGNITRONICS CORP	8	3	5.625	0.9	18.4
Q	CONNER PERIPHERALS	26	10	26	1.1	4.5
A	DATARAM CORP	19	8	18.375	3.8	25.6
N	EASTMAN KODAK CO	52	36	41.75	-0.1	-0.3
N	E M C CORP MASS	7	3	6	0.0	0.0
Q	EMULEX CORP	9	4	5.625	-0.1	-2.2
Q	EVANS & SUTHERLAND	35	17	31	0.1	0.4
Q	ICOT CORP	3	1	1.25	0.0	0.0
Q	INTERLEAF INC	9	5	7.75	0.0	0.0
Q	IOMEGA CORP	6	3	4.25	0.1	1.5
Q	LEE DATA CORP	4	1	1.438	-0.1	-8.0
Q	MASSTOR SYS CORP	4	1	1.375	0.1	4.7
Q	MAXTOR CORP	17	7	15.625	-0.1	-0.8
Q	MICROPOLIS CORP	9	3	8.25	-0.4	-4.3
N	MINNESOTA MNG & MFG CO	86	68	85.75	1.8	2.1
Q	PERSONAL COMP PRODUCTS INC	5	4	4.25	0.2	4.6
Q	PRINTRONIX INC	15	7	14	-0.1	-0.9
N	QMS INC	21	8	20.625	2.8	15.4
Q	QUANTUM CORP	23	9	21.25	1.0	4.9
N	RECOGNITION EQUIP INC	13	5	4.875	0.1	2.6
Q	REXON INC	10	6	8.625	0.0	0.0
Q	SEAGATE TECHNOLOGY	20	10	15.5	0.5	3.3
N	STORAGE TECH CORP	34	9	34	1.9	5.8
Q	TANDON CORP	3	0	2.75	0.2	7.3
N	TEKTRONIX INC	24	12	14.875	1.0	7.2
Q	TELEVIDEO SYS INC	1	0	0.469	0.0	-6.2
N	XEROX CORP	69	46	47.875	0.4	0.8

Leasing Companies

EXCH		52-WEEK RANGE		PRICE CLOSE JUNE 13, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
N	CAPITAL ASSOC INTNL INC	8	3	3.25	0.1	4.0
N	COMDISCO INC	34	17	19	-0.1	-0.7
Q	LDI CORPORATION	18	13	16	1.0	6.7
Q	PHOENIX AMERN INC	5	3	3.875	0.0	0.0

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL

Overboard

Tech investors jettison shares as profit dips loom on horizon

Fickle isn't the word for it. It may be wise to shed stock in a firm whose earnings have fallen, but what is it when investors jump to dump shares on mere speculation of lower-than-expected profits?

Nothing but trouble, according to Vitalink Communications Corp. After saying that earnings for the current quarter may dip, Vitalink watched its stock slip 2⅝ points by Thursday to close at 9⅝.

The big guys can also fall victim to the same shortsightedness. Digital Equipment Corp. fell 2⅛ points to 86⅜ on scuttlebutt that profits are not up to par. United Telecom, Inc. declined 2⅞ points to 40⅞ as analysts lowered earnings expectations for the company.

Amidst the earnings-related ambush, other companies hit new highs. Compaq Computer Corp. ballooned to 127⅜, up 8¼ points. Novell, Inc. also sat atop a new summit, up 5¼ points to 55. But wait, there's more. Share prices of Storage Technology Corp. were up ⅝ of a point last week to a new high of 33⅝.

Meanwhile, positive indicators in the semiconductor industry left Motorola, Inc. just shy of a new high, up 3 points to 86½, while Intel Corp. gained 1½ points to end at 48. In other news, Lotus Development Corp. gained 2½ points to finish at 38¼, after unveiling four Unix versions of its flagship spreadsheet. Oracle Systems Corp. and Borland International also picked up 2½ points each, to finish at 22¾ and 20⅝, respectively.

Hardware gainers included IBM, up 2⅛ points to 120⅞; Sun Microsystems, Inc., up 3 points to 33⅝; and Apple Computer, Inc., up 1½ points to 39¾.

KIM S. NASH

Wooing converts proves tough

BY AMIEL KORNEL
CW STAFF

While radical may be chic, the Next computer is no easy sell.

When Businessland, Inc. saleswoman Kathy Roepke demonstrated the Next workstation at Stratus Computer, Inc.'s Marlboro, Mass., headquarters last September, she was pleasantly surprised by enthusiastic reactions from employees.

"People, including a lot of end users, were there from 10 in the morning to four in the afternoon," recalled Roepke, who now manages the Stratus account for Businessland's Framingham, Mass., office. "Everyone was very excited."

Roepke was, too. She said she figured that the sale, one of Next's first volume deals in the commercial market, would be wrapped up before the end of the year.

However, marketing Next, which incorporates unusual features such as an optical disc, stereo sound and an Adobe Systems, Inc. Postscript display, turned out to be different from selling more established platforms. Although Stratus eventually did decide to buy the machine, nine months elapsed before the deal was done. The minicomputer maker ultimately ordered 44 Next systems.

Martha Everson

Businessland's Roepke *found the Next system a long sale*

A look at the Stratus deal reveals some of the hurdles that Next and its distributors must cross to clinch more contracts:

- **More than a personal computer.** Next's use of the Mach operating system, a Unix derivative, and its strong emphasis on Ethernet connectivity make it more than just another commodity product. Selling Next turned out to be much more like selling a minicomputer or mainframe than hawking a PC, Roepke said. In the case of Stratus, that meant requirements of compatibility and interoperability with the buyer's host systems had to be satisfied.
- **The unknown.** Convincing a company to invest in new, untried technology is a challenge. "I never realized the amount of [organizational] levels that need to evaluate and sign off on a new platform," she said.

A new platform is viewed as "somewhat of a risk," Next Vice-President of Sales Todd Rulon-Miller said.

- **Software, software, software.** The availability of a quality application is key. Stratus had decided, after a two-year search, to adopt Frame Technologies' Framemaker software, one of the roughly 30 packages that can run on the Next. "Then, we looked for what to run it on," said Carol Dean, manager of Stratus' technical publications department. After studying other workstation platforms, she made a recommendation to buy Next, she said, because "it felt extensible, easy to use, easy to learn, visually very clean and appealing."
- **Entrenched standards.** Sites free of installed PCs are better sales candidates for Next. At Stratus, the technical publishing staff previously worked on terminals running in batch mode off of a Stratus minicomputer. For some potential customers, a purchase can be delayed or scuttled if users accustomed to working on DOS-based PCs or Apple Computer, Inc. Macintoshes resist switching to Next's Mach.
- **Higher price.** Cost comparisons with similar platforms make Next a tough sell. Company President Steve Jobs has reportedly laid out a firm policy of no price negotiating. Although their list prices may not differ much from that of Next, sharp discounting of PCs and Macs can make Next a less attractive buy.

"A Next machine is priced lower than a comparable Mac or PC fully loaded [with software]," Roepke said. "But then, the Mac or PC has the heck discounted out of it and it comes out cheaper than the Next."

Barely passing

Enthusiasm in the higher education market, once considered key for Next, is on the wane.

"Winds on campus are blowing cool for Next use," said Tully Hammill, manager of library computer operations at the University of Washington in Seattle. "Nobody is satisfied," he said. High on the list of complaints, he explained, is the slow appearance of applications software.

Next Vice-President of Sales Todd Rulon-Miller argued that the company is doing well in higher education, citing more than 300 contracts signed with universities for service and support.

The stakes are high. The desktop market for higher education may be worth as much as $5 billion annually, according to Kenneth Green, senior research associate at the Center for Scholarly Research at the University of Southern California in Los Angeles.

Next has yet to make serious inroads into that market in terms of sales. Only about 100 of the 3,000 personal computers and workstations installed at Carnegie Mellon University, one of the company's founding investors, are from Next.

James Bruce, vice-provost for information systems at MIT, estimated that only 25 to 50 Next systems have been purchased through the school's microcomputer outlet. By contrast, students and faculty use about 12,000 IBM PC-compatibles and Apple Computer, Inc. Macintoshes on and off campus.

"People are asking, 'Do I want to invest a bundle of money in a machine that may not make it?' " Bruce said.

Revolution

FROM PAGE 1

"I'm not convinced Steve is still two years ahead," Bruce said.

For all of Jobs' braggadocio and tens of millions of investment dollars spent so far, the company continues to face formidable hurdles. A dearth of software applications and some disappointing technology have left potential buyers reluctant to commit to his new platform.

An exclusive distribution deal with computer retailer Businessland, Inc. that was expected to generate sales of $100 million by year's end has reportedly fallen far short, with Next insiders saying total unit sales, including direct sales to educational institutions, average only about 500 per month. These developments have observers wondering whether Next will live up to its early expectations.

Next's story provides would-be entrepreneurs with a textbook example of the difficulties of introducing a radical alternative to installed technologies.

"With Next, you're looking at the future," said Doug Edwards, marketing director at Informix Corp., which shipped a Next version of its popular Wingz graphic spreadsheet in early May. "But sometimes the future is a difficult thing to understand, let alone embrace."

While no one is writing off the company, questions are being raised about why it has been slow to make its mark in the industry Jobs helped spawn. "It's safe to say they're off plan," said Floyd Kvamme, a partner at Palo Alto, Calif., venture capitalist Kleiner Perkins Cauffield & Byers. Kvamme was previously executive vice-president at Apple.

From a financial point of view, Next can afford to take its time. Jobs and his financial backers — Japan's Canon Ltd., billionaire H. Ross Perot, Carnegie Mellon University and Stanford University — have invested $133 million in the venture. IBM has also thrown its weight behind the venture with a potentially lucrative licensing deal that has been variously reported at between $10 million and $50 million.

That makes Next about five times the size of an average Silicon Valley start-up, Kvamme said. Canon's 1989 investment of $100 million lifted the pro forma valuation of the company to $600 million, facilitating any borrowing Next may choose to do.

Observers noted, however, that even overflowing corporate coffers do not last forever if they are not replenished. Spending at Next has been high, although specific figures for the privately held company are not available. The high costs of research and development, advertising, a highly automated factory in Fremont, Calif., rental of its Redwood City, Calif., headquarters and payroll for more than 350 employees mean Next is burning funds at a fast rate.

Planting roots

Is Jobs worried? Not yet. "What we're trying to do is grow a big old oak tree, and that takes time," he said in an interview. "If you look beneath any oak tree, you'll see a root system that's as big as the tree itself. And that's the stage we're in."

Although Jobs described annual sales as "healthy but not off the charts," International Data Corp. (IDC) in Framingham, Mass., estimated that fewer than 7,000 Next computers have been sold. Many of these have been spread among a range of product evaluators and software developers. In contrast, IDC said Apple had shipped 445,000 Macs by January 1986, two years after its launch.

"They're clearly not where they want to be," said Dan Lavin of the Boston Computer Society's Next Users Group. "The question is, how far off are they?"

Next Vice-President of Sales Todd Rulon-Miller responded that it typically takes from 12 to 18 months of evaluation and testing before a new product hits its market stride. The Next machine only began that ramp-up cycle when the delayed operating system was introduced last October, Rulon-Miller said.

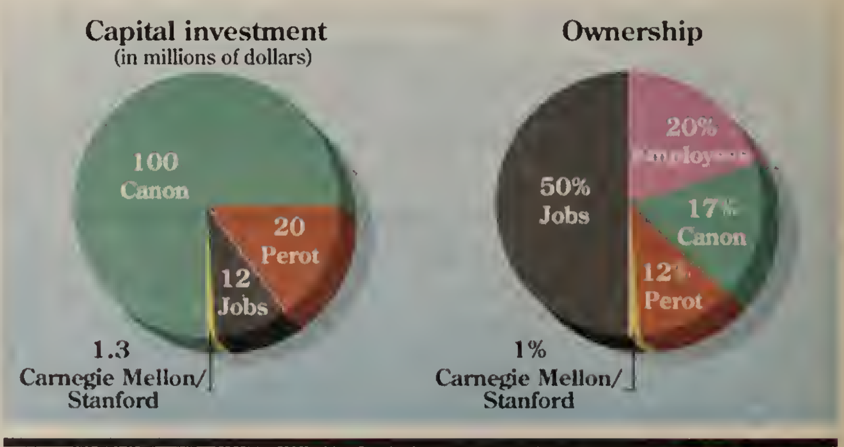
The slow pace of progress, however, hurts Next's chances for success a little more each day, observers said. "Everyone agrees that if it had been able to come out a year earlier, it would have seemed more spectacular," said Richard Cyert, president of Carnegie Mellon.

Although the workstation was once a distinctly bold and elegant innovation, many of the same features and functions can now be had at a lower cost from other vendors.

For example, icon-based windowing environments such as the Open Software Foundation's Motif, IBM's Presentation Manager and Microsoft Corp.'s Windows are making Next less

It's good to be the king

Jobs' investment of $12 million bought him 50% of Next, while Canon's $100 million only landed it 17% of the company in 1988



Source: Next, Inc.

CW Chart: Paul Mock

Nextstep seduces developers

BY JAMES DALY
CW STAFF

Steve Jobs positively glows when discussing Nextstep, the applications development environment that is turning heads among software authors. "Nextstep is ultimately our largest gem," the founder of Next said recently.

Although opinions of Next's hardware platform vary widely, the Nextstep package seems to garner widespread praise not only for its simplicity and strength but also for the doors it opens for developers.

The reason? While the Unix operating system offers sophisticated features such as powerful networking capabilities and multitasking, it also employs a laborious and archaic command system that is difficult to master.

Nextstep hides the complexity of working with and developing for Unix behind an icon-based system of pull-down menus and windows. The most widely regarded feature of Nextstep is the Interface Builder, which makes it easier to write programs by using prepackaged computer code known as "objects."

"Users need an interface that mere mortals can understand to get Unix on the desktop," Jobs said.

The Unix market is an important target for many to hit. Market research firm Dataquest, Inc. has predicted that by 1992, 26% of all desktop machines will be running some version of Unix.

Some analysts have also speculated that the popularity of Nextstep would one day propel Next into becoming a software-only company. Jobs, however, has clipped such theorizing. "Not likely," he said.

Software authors speak enthusiastically of the ease of developing programs with Nextstep. "It's a lot easier to prototype," said Alan Olsen, product development manager for Lotus Development Corp.'s Next spreadsheet project, which began in early 1989.

Turnabout

It may also be one of the great ironies of the computer industry that IBM, which Jobs once painted as the antithesis of everything he stood for back in his Apple days, has signed on to use Nextstep for its RISC System/6000 workstation.

Despite the significant vote of confidence, however, IBM's interest adds confusion to an already confused marketplace. Nextstep is not only out of step with IBM's proclaimed strategic emphasis on OS/2 but rests uneasily with its commitment to the Open Software Foundation's Motif interface.

Some analysts viewed IBM's endorsement of Nextstep as a hedge against its commitment to OSF/Motif and an admission that perhaps Nextstep's programming environment is superior. OSF/Motif sometimes seems like a product designed by committee, a committee over which IBM sometimes feels it has little control.

Although the Next interface and IBM's marketing department make a powerful combination, a key question is its ability to deliver meaningful applications in a timely manner.

Speaking in his typically confident manner, however, Jobs claimed that 150 software developers have made a major financial commitment to developing Nextstep applications and ranked the priority of developing Next packages only behind DOS, OS/2 and the Macintosh.

On-deck hitters

With hardware sales slow, Next hopes to lure customers to its platform with an array of upcoming enhancements:

- A model based on Motorola, Inc.'s 68040 microprocessor will be available by the end of the year. The current version uses the older 68030 chip. Today's users will be able to purchase an upgrade board for $1,495.

The only possible hitch is that a federal judge in Texas recently ruled that the architecture of the 68030 infringes on certain Hitachi Ltd. patents, and Motorola may be forced to stop selling the chip because the 68040 uses several of the same design features as the 68030.

- A system offering a color monitor has been promised for delivery before the snow flies. The new offering will provide photo-realistic color and a graphics accelerator.
- Because some users have complained that the Next machine still runs far too slowly to manipulate sophisticated applications quickly, speculation has begun to circulate that the firm will introduce a model based on the reduced instruction set computing (RISC) architecture.

Analysts said a likely supplier could be IBM, which has hinted that it may license out the superfast core of its RISC System/6000 line: the Performance Optimization With Enhanced RISC (POWER) chip. The 64-bit architecture provides I/O throughput of as much as 40M byte/sec. and is capable of processing up to five instructions per machine cycle.

JAMES DALY

Start-up stories

With less than 7,000 machines shipped in its first two years of business, Next is not setting any records

	Started shipping	Total number of U.S. shipments two years after announcement
Sun	Jan. 1982	1,700
Compaq	Jan. 1983	111,000
Apple Macintosh	Jan. 1984	445,000
Next	Oct. 1988	*6,775

*As of June 1990

Source: International Data Corp. CW Chart: Doreen Dahle

distinguishable from the rest of the pack. In addition, the workstations of most vendors today are offered with some flavor of Unix as an option.

The machine's innovative features include stereo sound, optical disc storage, a built-in Ethernet port and an Adobe Systems, Inc. Postscript-based video monitor offering what-you-see-is-what-you-get display. Its advanced Mach operating system is a Unix version developed at Carnegie Mellon.

Yet information systems executives who have evaluated the machine have been lukewarm, forcing Next to backpedal on some of the features it once called its most revolutionary. The 256M-byte optical disc, for instance, was once envisioned as Next's strongest lure, able to provide up to 200 times the capacity of a floppy disk and more than 10 times the storage of most hard disks. With the disc, it was envisioned that developers could beef up their standard offerings with such capabilities as dictionaries and comprehensive Help files.

However, users have complained that the device's performance is too slow, and Canon's shipments of the much-ballyhooed discs have "slowed significantly," according to a Dataquest, Inc. researcher at the firm's Storage Track '90 conference last month.

Last fall, acknowledging user complaints, Next was forced to offer a traditional magnetic hard disk as an option. Most of the units currently shipped reportedly include it.

Robert Holmgren

Jobs: *Next is 'trying to grow a big old oak tree, and that takes time'*

Many potential users also grumble about the absence of a floppy disk drive for copying programs and data. "It's strange to think about working without a floppy," said Perry Davis, senior vice-president of technology management at Saatchi & Saatchi Compton, Inc. in New York.

The machine's lack of a color monitor has also been cited. Jeff Katz, IS manager of the creative department at California advertising agency Foote, Cone and Belding, said Next would have to offer a color monitor before he would consider investing in the machine. "None of the art directors here would be able to work in a black-and-white world," he said. The agency currently has 265 Macs installed.

Next officials have promised a color monitor version by the end of the year.

A lack of wide-ranging software has also hampered sales and undermined Jobs' business plan. "When they get some better software, I'll give it a try," said Ed Klein, director of the information center at Humana, Inc. in Louisville, Ky.

Calling the machine "technology in search of an application," Davis said he does not see a "burning application that couldn't be done some way on the Mac." The advertising agency has 140 Macs divided between its New York and California offices, as well as 850 IBM Personal Computers.

"We need to supply incredibly great applications, and then the whole situation will take care of itself," Jobs said.

This is expected to happen during the next few months, as more and more business software developers host coming-out parties for Next-oriented applications, a Businessland spokesman said. "We're looking at lots of spreadsheet packages as well as word processing and front-end database applications," said Kevin Compton, director of advanced systems at the San Jose, Calif.-based firm.

A 40-member team at Lotus Development Corp. has been working full-time for more than a year developing a new spreadsheet for the Next machine. Although the Cambridge, Mass., company refused to say when its so-called Back Bay product will be available, Jobs indicated it would be out by the fall. He added that there will be at least one other spreadsheet coming out this year, in addition to the Wingz and Lotus packages.

The promotional capital earned from being part of Jobs' latest venture is reason enough for some software companies to commit to the machine. "It's a high-visibility platform," Edwards noted.

Some developers have found it easy to port their software to the Next computer. Stephan Adams, president of Oakland, Calif.-based Adamation, developer of an office automation system for managing and tracking client communications, said, "Our experience was fantastic."

Not all developers have found the port so simple, however.

"There is more flexibility in developing for [OSF's] Motif," Edwards said. Next is "being very religious about their interface. . . . It's an obstacle if you want to bring Mac applications over and make them work in the same way," he said.

A half-dozen engineers at Informix worked for more than a year to port Wingz to the Next platform.

"The port wasn't automatic," said Malcolm Hobbs, director of product marketing at 5-year-old Frame Technologies Corp. in San Jose, Calif. He said it took two engineers six months to port the company's Unix-based desktop publishing software to Next.

Neither Jobs' reputation nor his backers' deep pockets can carry the company indefinitely, observers warned. As developers continue their struggle to offer software applications, the novelty of Next seems to be wearing off. In the fickle and fast-moving world of computer start-ups, Steve Jobs' latest revolution has yet to earn a place in history.

NEWS SHORTS

Honeywell nabs Chrysler executive

Chrysler Corp.'s executive director of MIS, G. Nichols "Nick" Simonds, left the auto giant earlier this month to become Honeywell, Inc.'s new vice-president of corporate information management. Simonds replaced Irma M. Wyman, who retired in April. Simonds joined Chrysler as information systems chief in 1984 after 20 years in IS with Inland Steel Co. and the former National Steel Co. Chrysler named Harry A. Lewis, operations group controller and a 25-year company veteran, to replace Simonds.

....

Sun edges IBM

Sun Microsystems, Inc. produces the favorite workstation among Fortune 500 IS executives, according to a survey by The Sierra Group/First Boston MIS Executive Council. IBM's RISC System/6000 appears to have scored early points with users and came in second in the survey; Hewlett-Packard Co.'s Apollo division and Digital Equipment Corp. came in third and fourth, respectively. The survey ranked 13 issues that large companies consider when purchasing workstations, including compatibility, power, graphics capabilities and price.

....

Software groups unite

The Business Software Alliance, a group of six software companies taking legal action against software pirates in Europe and the Pacific Rim, has decided to merge with the larger Software Publishers Association (SPA), the Washington, D.C.-based groups announced last week. The Business Software Alliance will retain its name and become an arm of SPA responsible for international copyright and trade issues.

....

Memorex plans optical archive

An optical storage-based archiving system is under development at Memorex Telex Corp. Slated for delivery in the fourth quarter, the company's first optical system will include on-line report management and microfiche replacement functions and will involve transparent mainframe-attached optical disc drives and robotic media handling designed to place as much as 340 billion characters of storage in 15.8 sq ft. The system is currently being tested at several locations internationally.

....

Datapoint adopts Oracle

Datapoint Corp. last week announced that Oracle Systems Corp.'s Oracle 6 relational database software is now available to run on the hardware vendor's 7000 series of Intel Corp. 80386- and I486-based single and multiprocessor network servers. Using Oracle's SQLnet/Netbios protocol, Datapoint 7000 series servers can function as the database engine for any user on the network whose application employs this interface. According to Datapoint, a 7850 model server can support as many as 64 concurrent Oracle users on a network.

....

AT&T offers LAN products

AT&T announced a slew of local-area network interconnectivity products last week, including its first Fiber Distributed Data Interface (FDDI) offerings. An FDDI backbone interconnects 802.3 Ethernet LANs and an FDDI router is said to interconnect up to two FDDI Dual Access Station networks and up to 28 Ethernet LANs over a wide-area network. An FDDI concentrator is said to link any FDDI device, including bridges, routers and workstations, to an FDDI ring. AT&T also upgraded its Datakit II Virtual Circuit Switch.

....

Clip-art controversy roils

Computer Support Corp., a graphics software developer affiliated with Control Data Corp., sued Software Publishing Corp., alleging that hundreds of clip-art images contained in Computer Support products were copied without permission in three of Software Publishing's popular Harvard Graphics programs. The action is a counterclaim against a Software Publishing suit that claims Computer Support's software and clip art are not protected by U.S. copyright laws.

GAO: Uncle Sam hasn't been minding the books

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — Accounting system flaws and management lapses have contributed to hundreds of millions of dollars' worth of discrepancies in the books that account for public debt and related interest, the U.S. General Accounting Office (GAO) has found.

According to congressional auditors, the U.S. Treasury Department is unable to verify that reported interest payments equal actual payments. As of December 1988, 18 account balances totaling more than $53 billion had not been reconciled or verified since the early 1980s, the GAO said.

The GAO said it had neither sought nor found evidence of fraud or abuse but had found an account, out of balance by $163 million, that appeared vulnerable to fraud. However, the report did identify almost $1 billion in errors.

Officials at the Treasury's Bureau of the Public Debt generally agreed with the auditors' conclusions but said substantial progress had been made in recent months in reconciling accounts. Richard Gregg, commissioner of the Public Debt, said the bureau's own extensive efforts to clean up discrepancies had turned up no evidence of payment errors or incorrect issues of securities. No improprieties were found, he said.

Gregg said the bureau had reconciled 16 of 18 accounts. However, the two remaining accounts total about $37 billion. He said the remaining imbalances involve transactions going back a number of years, while current accounts have balanced for the past two years.

One of the accounts not yet reconciled tracks over-the-counter deposits and disbursements in the Securities Transactions Branch. The GAO cited earlier reviews by the Treasury Department that found that "the branch's internal controls were so lax that unauthorized employees had access to blank Treasury checks and the checkwriter."

Calling the weaknesses "serious, widespread and long-standing," the GAO cited the Treasury's failure to perform timely account reconciliations, lack of controls for detecting and correcting errors, lack of systems integration, poor accounting system documentation and lack of training for accountants.

Gregg said account imbalances often occur because of timing differences caused by the bureau's patchwork of antiquated manual and automated subsystems. The situation will be much improved when the bureau installs a new integrated accounting and reporting system next year, he said. Gregg also said that the underlying systems that actually control payments and securities have better controls than the accounting system.

The new Public Debt Accounting and Reporting System, begun in 1986, is being developed by the Federal Reserve Bank of Cleveland. It will be installed on an IBM 3081 mainframe and will have electronic links to each of the 36 Federal Reserve banks and branches. The banks and branches, which handle much of the day-to-day activity in Treasury securities, will send transaction records to the Bureau of the Public Debt in daily batches or on-line, said Van Zeck, deputy commissioner of the Public Debt.

The new system will offer two key advantages over the existing collection of loosely coupled subsystems, Zeck said. All data will be sent in electronic form, eliminating the error-prone data keying from paper transactions. The system will also employ double-entry accounting, eliminating the need to reconcile the single-entry subsystems.

The GAO said the new system will help, but management will also have to strengthen its oversight of operations.

Unisys backs Presentation Manager

BY ELLIS BOOKER
CW STAFF

BLUE BELL, Pa. — Seeking to enlarge its presence in the network computing market, Unisys Corp. today plans to publish a common user interface for CTOS, its multiuser computer system.

Company officials said last week that Unisys has licensed and will support Microsoft Corp.'s Presentation Manager — becoming the first non-OS/2 operating system to do so — as well as Microsoft compilers. On the Unix front, Unisys said CTOS/Open will be the first non-Unix operating system to support the government's Posix specification. These tools will be the core of the next generation of CTOS' software development environment, Unisys said.

At a conference for CTOS users and international developers being held in Paris today, Unisys plans to publish application programming interfaces based on Presentation Manager for both graphical and character-based CTOS workstations.

The move will complete the effort, begun at last year's Paris conference, to standardize the CTOS systems sold by Unisys, France's Groupe Bull and eight other vendors [CW, June 19, 1989]. According to Unisys, there are 740,000 of the modular CTOS systems, which are based on Intel Corp. 80286 and 80386 microprocessors, installed worldwide.

Unisys' commitment to a graphical user interface was praised by CTOS user Dan Lienau, director of data processing at the Wisconsin Department of Employment Relations in Madison. "I'm glad they're moving that way," said Lienau, adding that applications for his network of 55 diskless CTOS workstations "lack some of the features and user-friendliness available for PC LANs."

CTOS is a dual operating and multiuser networking system that Unisys has owned since 1988, when it acquired Convergent Technologies, Inc., a CTOS developer and OEM.

While arguing that CTOS/Open is both less expensive and more powerful than the two dominant alternatives for multiuser computing — minicomputer-based architectures and personal computer local-area networks — Unisys officials and analysts acknowledged that CTOS has been somewhat of a sleeper in the marketplace.

"Nobody calls up Unisys asking for a CTOS solution," said Drew Hoffman, vice-president and general manager of Unisys' Network Computing Group-Distributed Systems Division.

However, John Logan, vice-president of The Aberdeen Group, a market research and consulting firm in Boston, said he believes that CTOS, with its message-based operating system, offers the distributed computing now that IBM still promises with its Officevision.

Logan said the configuration requirements for CTOS computing are far less than IBM's Systems Application Architecture and OS/2 Extended Edition combination.

Olsen

FROM PAGE 1

sluggish U.S. market and slowing European computer sales meant "external forecasts of this quarter's earnings would appear to be too optimistic."

"I think Wall Street, in the last week or so, is catching on that this is going to be a bad quarter," said Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco.

Martha Everson

DEC's Kenneth H. Olsen *says firm's future is bright*

The VAX 9000 shipping delay is being caused by manufacturing glitches, delays with parts suppliers and the complexity of the operating system, Olsen said. He declined to predict any show of profit from mainframe sales in 1991.

Olsen did say that "end-of-the-season doldrums" would not force his company into massive layoffs or slow the pace of research and development. He said there is no corporatewide goal for employee cutbacks, even though DEC has managed to convince only about 2,000 employees out of more than 125,000 to take advantage of generous severance plan offers.

Olsen argued that chopping down the payroll can damage a company's customer service once it begins to grow again. "We make no claims this quarter is going to show all the positive things that people are looking for," he said, "but our investments are to grow, not to cut back."

The next round of new hardware products is expected during the second week in July at Decworld in Boston, with the announcement of the VAX 4000 and a line of applications servers, according to several analysts. The VAX 4000 is the successor to the Microvax 3800 and 3900. Equipped with a more advanced chip from the 6000 line, it will deliver twice the performance, expandability, memory and storage capacity.

In his discussion of the changes under way at DEC, Olsen acknowledged that Jack Smith, senior vice-president of operations, is assuming more of the day-to-day responsibilities of running the company. "I dump everything I can think of dumping on him," Olsen said.

"I think we're carefully making believe there's not a spotlight on him," the DEC founder and president explained. "It's unhealthy, you see, to be crown prince when the king isn't about to give up."

Olsen also hinted at coming changes in the company's approach to the retail computer market, which DEC has assiduously avoided since its disastrous attempt with the Rainbow and Professional personal computers in the early 1980s. The company is now working on its own Intel Corp. 80386- and I486-based desktop machines and will likely go through retail channels to target small business customers.

For its customers in the Unix world, Olsen said DEC would eventually "phase together" its own Ultrix operating system with the OSF's OSF/1 operating system. Analysts interpreted that to mean that DEC would essentially replace the underpinnings of its own Unix version with the OSF standard.

"Ultrix will still be DEC's implementation of Unix, but OSF/1 will be the base level operating environment," said Dale Kutnick, an analyst at Meta Group, Inc. in Westport, Conn. "What most vendors will do is add their own value on top of this basic Unix system that has been standardized."

While Olsen said he no longer believes in committing to "a VMS-class Ultrix," he confirmed that the company is spending as much or more on Ultrix development as on VMS. The spectrum of scientific and technical DEC users who demand Unix is "a large part of our market and very important to us," Olsen said.

Features Editor Glenn Rifkin contributed to this report.

Take it from the top

Ken Olsen, DEC's only president in its 33-year history, is known to be colorful and candid. In an interview with *Computerworld* last week, Olsen spiced his comments with views of DEC and the industry.

- On the confusion caused by DEC's stream of product announcements: "There are a lot of products coming out, and that does cause confusion. But we have a choice of getting behind or making too many products."
- On whether problems within the sales force drove away former Senior Vice-President Jack Shields after 28 years at DEC: "I don't know. I never asked him. It just didn't seem polite. He didn't say that was why. He didn't say at all."
- On efforts to reduce the employee head count: "I'm not saying that's not going on. I'm not conscious of it because it's not at the level where it's my kind of problem."
- On whether DEC has plans to resell Apple Computer, Inc. Macintoshes: "I asked that question and so far haven't gotten any good answers back. If anything, I say we should have done it years ago."
- On the continuing doldrums for DEC stock: "Wall Street is interested in profit today, and we're not making the profit today we should."
- On paying a dividend to shareholders: "We've been making cash for quite a while now. It's probably the right assumption that we should pay dividends. The problem is, our advisers say 'Not now.' "

GLENN RIFKIN

DEC upgrades, renames line of CASE tools

BY MAURA J. HARRINGTON
CW STAFF

Digital Equipment Corp. coined an umbrella name for its computer-aided software engineering (CASE) strategy — Cohesion — and announced enhancements to its current products and services last week.

Cohesion supports the development, deployment and management of DEC's CASE strategy, which is built on its Network Applications Support platform, according to Marion Dancy, DEC's application development systems group manager.

A key component of Cohesion, according to Dancy, is CDD/Repository, DEC's distributed repository based on an object-oriented interface.

The latest version of CDD/Repository, introduced last week and slated for availability by the first half of 1991, was designed to run on both DEC VMS and Ultrix platforms, Dancy said.

CDD/Repository reportedly allows the user to run both technical and commercial applications and organize them in an object-oriented manner.

The new version allows a user to change part of a program without disrupting the whole, said Alfonso DiIanni, DEC's engineering CASE program manager.

DEC also unveiled CDD/Administrator, VAX Rally Version 2.2 and Vaxset Version 10.

CDD/Administrator is a Decwindows/Motif-based tool that gives users access to CDD/Repository, Dancy said.

Vaxset Version 10 includes five new CASE components, which provide capturing, viewing and reporting capabilities for VAX 6000/9000 for vector processors.

Ingres/DEC deal tabled

BY JEAN S. BOZMAN
CW STAFF

ALAMEDA, Calif. — It would have meant millions of dollars in cash for Ingres Corp., but Digital Equipment Corp. last week refused to take a proposed minority position in the relational database company.

Ingres said it announced the break in negotiations because the Securities and Exchange Commission considered it a "material" event that could have affected Ingres stock prices.

Negotiations between the two firms broke off after a month of meetings, Ingres Vice-President of Marketing Chris Greendale said. "We were looking to establish a closer relationship with DEC and to gain an additional source of cash," Greendale explained. "But the talks broke off around the issue of supporting open systems. We really have a problem with any relationship that wouldn't allow us to do that."

DEC would not comment on the details of the negotiations, which were initiated by Ingres. "We mutually agreed not to build a technical partnership with them," said DEC spokesman Jeffry Gibson. "We will continue our other activities with them, which include licensing agreements." Ingres wrote the Ultrix/SQL relational database management system that is packaged with some DEC Unix workstations, and the Ingres DBMS is sold as an option for DEC VAX computers.

DEC may have been wary of making a commitment to Ingres at a time when it has made pacts with Ingres competitors. "DEC just recently made announcements about marketing agreements with Oracle and Sybase," said Rob Anderson, a software consultant at Stratagem, Inc. in San Francisco. "A lot of things probably got thrown into DEC's decision — and the degree of discomfort it would cause other vendors was probably part of it."

Greendale indicated that the search for more cash for $130 million Ingres would probably continue. "We're in a cash-burn business. Anytime you're growing at 30% or more, you burn cash," Greendale said. "So we're still looking."

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.
Copyright 1988 by CW Publishing/Inc. All rights reserved.
Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: back issues, if available, may be purchased at $2.00 per issue, plus postage. Call (800) 669-1002.
Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970, 508-744-3350.
Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. For Back issues contact Margaret McIndoe.
Requests for missing issues will be honored only if received within 60 days of issue date.
Subscription rates: $2.00 a copy: U.S. — $48 a year; Canada — $110 a year; Central & So. America — $130 (surface), $250.00 (airmail) a year; Europe — $195 a year; all other countries — $295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002.
POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, P.O. Box 2044, Marion, OH 43305.

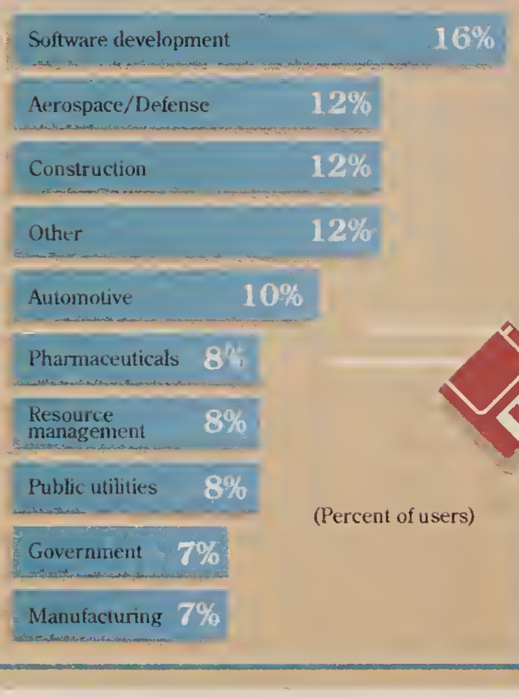
TRENDS

PC Project Management Software

Though they may lack a lot of the power and features of the mainframe versions, they're quite flexible; for nonprogrammer types, a PC-based project management package is one way to get up and running fast

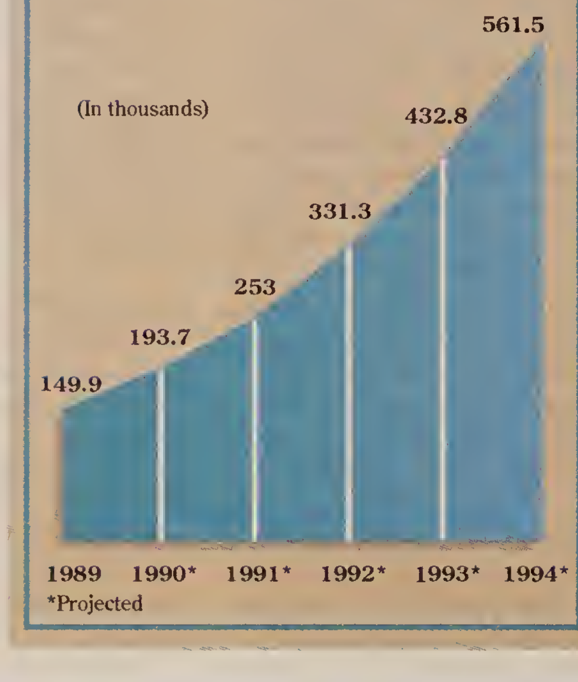
Usage by industry, 1989

Users of PC-based project management software are evenly dispersed among numerous industries



Worldwide shipments

Sales are expected to increase steadily, with approximately 65% of the total being shipped within the U.S. and the rest distributed internationally



Top six packages installed worldwide

Some of the packages with the largest installed bases are also among the least expensive on the market; prices of PC-based project management software range from $270 to $5,000

Vendor	Product	1989 installed base	List price
Symantec	Timeline	150,000	$595
Applied Business Technology	Project Workbench	60.000	$1,275
Software Publishing	Harvard Project	50,000	$695
Microsoft	Microsoft Project	50,000	$495
Computer Associates	Superproject Expert	40,000	$690
Micro Planning	Instaplan	30,000	$270

Source: International Data Corp., Framingham, Mass.

CW Chart: Tom Monahan

NEXT WEEK

Carol J. Anderson ▸ has systems on the move at Trailer Train Co. after just six months as vice-president of MIS. An 18-year information systems veteran at the Chicago company, Anderson believes in results through teamwork — whether on the job or racing sailboats on the weekend. Find out more about her in Manager's Journal.

David Joel

The first in a series of performance benchmarks for the integration of CASE and fourth-generation language products begins in Systems & Software. The benchmarks, done by Computer Futures Ltd., show the capability of the major CASE/4GL systems under live fire conditions while illustrating form, style and level of integration.

INSIDE LINES

Executive line

Cognos stock is up approximately 200% from about $3 per share late last year, and company sources say that its soon-to-be-issued second-quarter report will be on the upbeat side as well. It could be purely by accident that the recently struggling software maker's uptick coincides with the advent of former Cullinet Software marketing Vice-President Jeffrey Papows to Cognos' top marketing spot last fall — then again, maybe not. According to sources close to the company, Papows will be named president this week.

We should be surprised?

Apple may soon have to look outside its gates to find a successor to Allan Loren, who abruptly left his post as head of Apple USA in January. Apple execs are finding it a tough slot to fill: Four people have passed through the job in the past five years and met with frustration at Apple's continually shifting focus about what it wants to do in the domestic market. Sources say several top-level insiders, including Bill Coldrick, senior vice-president for U.S. sales, have so far nixed offers for the job.

Too hot to handle

A still-unreleased Environmental Protection Agency report recommended that extremely low-frequency electromagnetic fields, such as those sometimes related to VDTs, be classified as a "probable" cause of human cancer. That recommendation was rescinded pending further review, according to Louis Slesin, editor of *Microwave News.* In a summary of the report, the EPA said that the health relationship was stronger in high-exposure jobs, such as power-line workers, but that lower-dose effects could not be ruled out.

Somebody's idea of a peace dividend

The Department of Defense is looking for a company to research the potential of "using computer viruses as an electronic countermeasure technique against generic military communications systems/nets." The DOD also wants to find out if computer viruses could be injected into enemy computers by radio transmission.

Top-secret defection

Users rated Computer Associates' ACF2 as the best mainframe security program in last week's *Computerworld* Buyers' Scorecard, but the co-author of the product has bolted from CA to start his own company. Eberhard Klemens, a vice-president of research and development at CA, has founded the Eberhard Klemens Co. in Naperville, Ill. Klemens co-founded original ACF2 vendor SKK, Inc., which was acquired by Uccel, which was then acquired by CA.

The Blue LAN plan

Separate from PC Expo, look for IBM to make several LAN-related announcements this week. A source revealed the following tidbits: A new version of TCP/IP that supports Netview, full Ethernet support for all its products and enhanced LAN support for the Risc System/6000. IBM will also announce support for the Kerberos access security mechanism.

The French connection

3Com continues to push itself overseas. Like other makers of ancillary computer devices, the Santa Clara, Calif.-based networking company is already planning Soviet inroads. One company executive said 3Com may piggyback Groupe Bull to enter the new market. Bull, the executive pointed out, has the experience and poise to move in, and it could help decipher the connectivity problems that will exist.

We've heard of going for the jugular, but this is a bit overboard: We've been told that at a recent Oracle regional sales meeting in Boston, the sales manager had a fountain pen filled with real blood with which salespeople were supposed to sign a contract to commit 100% to selling Oracle software. Oracle would neither confirm nor deny that report. A better way to motivate the sales force is to tell 'em what they're doing wrong, and that's what we're here for. Contact Assistant News Editor Jim Connolly at 800-343-6474 or fax your best information to 508-875-8931.

The plan that didn't quite fly

The plan that couldn't stand on its own.

The plan that fell short.

Unfortunately, not all plans have paid off as well as the AT&T *MEGACOM*® WATS Term Plan.

And now it'll pay off even more by saving you at least $900 a year.

Did you know the AT&T *MEGACOM* WATS Term Plan can save you $900 a year or more on outbound domestic calls. That's along with the 40% discount you're already receiving as a *MEGACOM* WATS customer.* Plus you'll get extra savings on international calls.

The Term Plan is so flexible that in most cases should your bill fluctuate by season, you can still save. Numerous discounts are available to suit your level of usage. You can begin saving with an average monthly bill as low as $2,500. You also have the option of choosing an 18- or 36-month plan. Plus, for a limited time, we'll even waive the monthly service charge.

And if you're not currently using AT&T *MEGACOM* WATS, we'll also pay the installation and start-up fees.** But you don't have to wait for installation to start saving. Savings start as soon as your order is placed.

If you're with another company, we'll also pay the majority of the switchover fees. And if after 180 days you're not fully satisfied, we'll even pay to switch you back. With that kind of satisfaction guarantee, you just can't go wrong.

So sign up now. You couldn't pick a more foolproof plan. Offer expires October 9, 1990. Installation needed by December 10, 1990.

AT&T MEGACOM *WATS Term Plan.*
Another AT&T advantage.

Act now and take advantage of our free trial offer on AT&T Card EXECU-BILL℠ service—a management tool for controlling card costs.

For more information, please call your Account Executive or 1 800 247-1212, Ext. 571.

AT&T
The right choice.

©1990 AT&T

*Discounts on average as compared to AT&T basic interstate service for a typical business call. Actual savings will vary according to calling patterns.

**Central Office Connection and Central Office Function charges not included in waiver offer.

INTEGRAL & IBM Deliver the Power of SAA Financial and HRMS Solutions

Today you need answers. Integral and IBM deliver them. Powerful, proven SAA financial and human resource management solutions that cross all of IBM's strategic platforms — mainframe, midrange and PC — so you can realize the full potential of your hardware and software investment. Now and in the future.

Integral products have established the benchmarks for efficiency, flexibility and performance on all IBM platforms. And we continue to be the industry's standard bearer.

Take workgroup computing and office automation. They're the wave of the future. And Integral is already there, in the forefront. Our powerful new HR Vision implements IBM's OfficeVision, breaking new ground for cooperative processing.

It's exactly what you'd expect from the company that delivered the first applications to take advantage of the relational capabilities of DB2 in 1987. And we continue to lead the industry in SAA solutions with more DB2 product installations than all our competitors combined.

Integral — IBM's Prominent Business Partner

It's that commitment to being the industry's most consistent force that led IBM to name Integral its Outstanding Business Partner for the second consecutive year. It's a recognition for excellence that's unprecedented in the industry. We earned it for exceptional performance in delivering software solutions to IBM customers. And you can be sure we'll continue the tradition.

To Learn More. . .

Call for a free video about Integral or HR Vision, our new IBM OfficeVision product. Ask for complete product information on Integral's SAA financial and HRMS solutions.

In the U.S. **800/824-8199;**
In California **800/824-8198;**
In Canada **415/939-3900.**

IBM Business Partner

INTEGRAL

2185 N. California Blvd., Walnut Creek, CA 94596